

U.S. ENVIRONMENTAL PROTECTION AGENCY

**RECORD OF DECISION
AMENDMENT**

**SOUTH MUNICIPAL WATER SUPPLY WELL
SUPERFUND SITE**

SEPTEMBER 30, 2010

**Record of Decision Amendment
Table of Contents**

PART 1 - THE DECLARATION

- A. SITE NAME AND LOCATION
- B. STATEMENT OF BASIS AND PURPOSE
- C. ASSESSMENT OF THE SITE
- D. DESCRIPTION OF THE ROD AMENDMENT SELECTED REMEDY
- E. STATUTORY DETERMINATIONS
- F. ROD AMENDMENT DATA CERTIFICATION CHECKLIST
- G. AUTHORIZING SIGNATURES

PART 2 - THE DECISION SUMMARY

- A. INTRODUCTION AND STATEMENT OF PURPOSE
 - 1. Site Name
 - 2. Site Location
 - 3. Lead and Support Agencies
 - 4. Statement of Purpose
 - 5. Availability of Documents
- B. BACKGROUND INFORMATION
 - 1. Site Description
 - 2. Site History and Contamination
 - 3. 1989 ROD Selected Remedy
 - 4. Changes to the 1989 ROD Selected Remedy
 - 5. 1989 ROD Remedy Implementation
- C. BASIS FOR THE ROD AMENDMENT
 - 1. Updated Nature and Extent of Contamination
 - (a) Soil
 - (b) Groundwater
 - (c) Sediment
 - (d) Surface Water
 - (e) Vapor Intrusion
 - 2. Risk Analysis
 - (a) Human Health Risks
 - (b) Ecological Risks

Record of Decision Amendment Table of Contents

- D. DESCRIPTION OF CLEANUP ALTERNATIVES CONSIDERED
- E. EVALUATION OF CLEANUP ALTERNATIVES
 - 1. Threshold Criteria
 - 2. Primary Criteria
 - 3. Modifying Criteria
 - 4. Comparative Analysis
- F. RATIONALE FOR THIS 2010 ROD AMENDMENT SELECTED REMEDY
- G. DESCRIPTION OF FUNDAMENTAL CHANGES BETWEEN THE 1989 ROD REMEDY AND THIS 2010 ROD AMENDMENT REMEDY
 - 1. Remedy Comparison
 - 2. Remedial Action Objectives
 - (a) 1989 ROD RAOs
 - (b) 2010 ROD Amendment RAOs
 - 3. Changes in Expected Outcomes
- H. SUPPORT AGENCY COMMENTS
- I. STATUTORY DETERMINATIONS
 - 1. The Amended Remedy is Protective of Human Health and the Environment
 - 2. The Amended Remedy Complies with ARARs
 - 3. The Amended Remedy is Cost Effective
 - 4. The Amended Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable
 - 5. The Amended Remedy Satisfies the Preference for Treatment as a Principal Element
 - 6. Five Year Reviews
- J. PUBLIC PARTICIPATION
- K. DOCUMENTATION OF SIGNIFICANT CHANGES FROM THE PROPOSED PLAN

PART 3 - THE RESPONSIVENESS SUMMARY

- A. PREFACE
- B. SUMMARY OF COMMENTS RECEIVED AND EPA RESPONSES

Attachment A: Public Hearing Transcript

Record of Decision Amendment Table of Contents

APPENDICES

Appendix A:	Figures
Appendix B:	State of New Hampshire Letter of Concurrence
Appendix C:	ARAR Tables

**Record of Decision Amendment
Part 1 – The Declaration**

A. SITE NAME AND LOCATION

South Municipal Water Supply Well Superfund Site
Peterborough, Hillsborough County, New Hampshire
CERCLIS Identification No.: NHD980671069
Responsible Party Lead

B. STATEMENT OF BASIS AND PURPOSE

This decision document presents an amendment to the September 27, 1989 Record of Decision (ROD) that identified the selected remedial action for the South Municipal Water Supply Well Superfund Site in Peterborough, New Hampshire (the Site), which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 USC §9601 *et seq.*, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, as amended. The Director of the Office of Site Remediation and Restoration (OSRR) of the United States Environmental Protection Agency (EPA) Region 1 has been delegated the authority to approve this Record of Decision (ROD) Amendment.

Under Section 117 of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300.435(c)(2)(ii), EPA can propose an amendment to the Record of Decision (ROD) if the differences in the remedial or enforcement action, settlement, or consent decree fundamentally alter the basic features of the selected remedy with respect to scope, performance, or cost. An Amendment to the September 1989 ROD for the Site is necessary because the original remedy is no longer functioning as intended by the 1989 ROD and subsequent Explanation of Significant Differences (ESDs).

This decision is based on the Administrative Record developed in accordance with Section 113(k) of CERCLA and which is available for review at the Peterborough Town Library and the U.S. EPA Records and Information Center, 1st floor, 5 Post Office Square, Boston, Massachusetts during normal business hours. The Administrative Record Index identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based. In accordance with 40 CFR §300.825(a)(2), this ROD Amendment will become part of the Administrative Record.

The State of New Hampshire concurs with the selected remedy described in Section D of this Declaration and presented in further detail in Part 2 - The Decision Summary, attached hereto.

**Record of Decision Amendment
Part 1 – The Declaration**

C. ASSESSMENT OF THE SITE

The response action selected in this ROD Amendment is necessary to protect the public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

D. DESCRIPTION OF THE ROD AMENDMENT SELECTED REMEDY

This ROD Amendment changes the original remedy set forth in the 1989 ROD for the Site. Both the original 1989 selected remedy and this ROD Amendment selected remedy included a combination of technologies to provide a comprehensive approach for Site remediation by targeting treatment of contaminants in soil and groundwater located within high concentration source areas. This ROD Amendment also eliminates the extraction and treatment requirements for contaminated groundwater, which has failed to provide a level of hydraulic control required to protect the South Municipal Water Supply Well.

Specifically, this ROD Amendment selected remedy will include the following major components:

- in-situ thermal treatment of contaminated soil and groundwater in identified source areas;
- in-situ bioremediation of contaminated soil and groundwater after the in-situ thermal treatment program;
- in-situ treatment of contaminated groundwater via a permeable reactive barrier (PRB);
- monitoring and maintenance of existing institutional controls (ICs) that prohibit the use of groundwater;
- long-term monitoring of Site groundwater; and
- Five-Year Reviews to ensure that the selected remedy remains protective of human health and the environment.

This ROD Amendment addresses the principal and low-level threat wastes at the Site by reducing the contaminant mass within the identified source areas, including any dense non-aqueous phase liquid (DNAPL), to reduce risks presented by source areas and to achieve groundwater restoration that permits the return of the South Municipal Water Supply Well to the Town of Peterborough as a drinking water source without the implementation of wellhead treatment.

E. STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Record of Decision Amendment

Part 1 – The Declaration

The selected remedy also satisfies the statutory preference for treatment as a principal element of the remedy by reducing the toxicity, mobility, and volume of source materials comprising principal threats through in-situ thermal treatment of contaminated soil and DNAPL in identified source areas; in-situ bioremediation of residual soil and groundwater contamination and residual DNAPL after the in-situ thermal treatment program; and in-situ treatment of contaminated groundwater via a permeable reactive barrier (PRB). Reduction of contaminant mass from identified source areas will also diminish the VOC's entering the groundwater and reduce the potential sources of vapor intrusion (VI) at the Site.

Because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure (and groundwater use restrictions are necessary), reviews will be conducted every five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

F. ROD AMENDMENT DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD Amendment or is referenced to the 1989 ROD when the language from the original 1989 ROD did not require revision. Additional information can be found in the Administrative Record for this Site.

1. Chemicals of concern (COCs) and their respective concentrations.
2. Baseline risk represented by the COCs.
3. Cleanup levels established for COCs and the basis for the levels.
4. How source materials constituting principal threats are addressed.
5. Current and reasonably anticipated future land assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD Amendment.
6. Potential land and groundwater use that will be available at the Site as a result of the selected remedy.
7. Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected.

**Record of Decision Amendment
Part 1 – The Declaration**

8. Key factor(s) that led to selecting the remedy, including a description of how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria and highlighting criteria key to the decision.

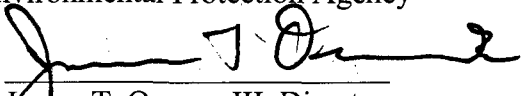
G. AUTHORIZING SIGNATURES

This ROD Amendment documents the fundamental changes required to the 1989 ROD selected remedy (and subsequent decision documents) for the South Municipal Water Supply Well Superfund Site. The State of New Hampshire Department of Environmental Services (NHDES) concurs with the selected remedy.

Concur and recommend for immediate implementation:

U.S. Environmental Protection Agency

By:


James T. Owens, III, Director
Office of Site Remediation and Restoration
EPA New England, Region 1

Date:

9/30/10

**Record of Decision Amendment
Part 2 – The Decision Summary**

A. INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

1. SITE NAME

South Municipal Water Supply Well Superfund Site
Peterborough, Hillsborough County, New Hampshire
CERCLIS ID No.: NHD980671069
Responsible Party Lead

2. SITE LOCATION

The South Municipal Water Supply Well Superfund Site (the Site) is located in the Town of Peterborough in Hillsborough County, New Hampshire, approximately 2 miles south-southwest of the town center and 26 miles west-northwest of Nashua, New Hampshire (**Figure 1**) (Note: all figures are included in Appendix A). The Town of Peterborough has a population of approximately 6,100 and an estimated 170 residents live within one mile of the Site and an estimated 1,300 live within two miles.

Peterborough is located within the Contoocook River Valley of the Monadnock Plateau and the north flowing Contoocook River bisects the Site. Topography within the area is typified by gently rolling hills to steeply sloping ridges and varies from narrow valleys to low-lying floodplains. Based upon topographic and hydrologic information, regional surface water and groundwater discharge to the Contoocook River.

3. LEAD AND SUPPORT AGENCIES

Lead Agency

**U. S. Environmental Protection Agency - Region 1
Office of Site Remediation and Restoration**

Contact: Kevin S. Heine, P.G.
Remedial Project Manager
(617) 918-1321

Support Agency

**New Hampshire Department of Environmental Services (NHDES)
Waste Management Division**

Contact: Thomas C. Andrews, P.E.
Project Manager, Hazardous Waste Remediation Bureau
(603) 271-2910

Record of Decision Amendment Part 2 – The Decision Summary

4. STATEMENT OF PURPOSE

An Amendment to the September 27, 1989 Record of Decision (ROD) is necessary because a fundamental change to the original selected remedy is needed to further address the Site source areas and restore groundwater located downgradient of the New Hampshire Ball Bearing, Inc. (NHBB) property for future use. This Amendment documents the basis for this fundamental change. This ROD Amendment is issued in accordance with CERCLA §117 and NCP 40 CFR §300.435(c)(2)(ii).

5. AVAILABILITY OF DOCUMENTS

This ROD Amendment and supporting documentation will become part of the Administrative Record for the Site. Information pertinent to EPA's decision-making process in publishing this ROD Amendment is available for public viewing at the following information repositories:

U.S. EPA Records and Information Center

5 Post Office Square, Suite 100
Mail Code: OSRR02-3
Boston, Massachusetts
(617) 918-1440
Hours: 9:00 a.m. – 5:00 p.m.

Peterborough Town Library

2 Concord Street
Peterborough, New Hampshire
(603) 924-8040

Information is also available for review online at: www.epa.gov/ne/southmuni

B. BACKGROUND INFORMATION

1. SITE DESCRIPTION

The Site encompasses approximately 250 acres that includes the South Municipal Well and nearby commercial and residential properties located along Sharon Road; portions of the Contoocook River and U.S. Route 202; the 24 acre New Hampshire Ball Bearings, Inc. (NHBB) property, and adjacent wetlands and undeveloped parcels (**Figure 1**).

Site geology consists of heterogeneous glacial and fluvial deposits overlying metamorphic and plutonic bedrock. The overburden deposits generally consist of fine to very coarse-grained sands interbedded with discontinuous clayey or silty seams and some gravelly cobble zones. Except for a basal till that overlies bedrock, deposits generally coarsen with depth and towards the east. The total thickness of the overburden is dependant on the elevation of the bedrock surface and

Record of Decision Amendment

Part 2 – The Decision Summary

ranges from 20 to 90 feet thick beneath the Site. The overburden is thickest on the NHBB property in the area east of the manufacturing facility and generally thins further east. The average saturated thickness within the overburden is 56 feet.

Groundwater flow beneath the Site under static and pumping conditions is predominantly to the east, northeast in the vicinity of the NHBB property and changes to a more northerly direction parallel to the Contoocook River in the area east of Route 202. Potentiometric surface data from bedrock wells indicate a northeasterly groundwater flow direction within bedrock. Vertical groundwater flow components across the Site are generally from the overburden to bedrock in the area east of Sharon Road and upward (from bedrock to overburden) across the rest of the Site. In general, groundwater present within the overburden demonstrates unconfined to semi-confined aquifer characteristics and groundwater within the bedrock exhibits leaky-confined aquifer characteristics, with the glacial till providing primary confinement.

The NHBB facility, identified as the source of contaminants in the South Municipal Well, is upgradient of and approximately 1,200 feet west-northwest of the South Well and 800 feet west of the Contoocook River. Elevations across the Site generally range from 770 feet above mean sea level (msl) along the river to 820 feet along the western edge of the NHBB property. The NHBB property currently consists of an active manufacturing facility, asphalt parking lots, a groundwater treatment facility, and wetlands. An unnamed creek runs easterly across the northern edge of the NHBB property and drains into the wetlands located between the eastern edge of NHBB's northern parking lot and Route 202.

Land use adjacent to the Site is mixed. Commercial properties are located north of the Site along Route 202, rural residential properties are located west of NHBB, a multifamily residence is located adjacent to the South Municipal Well, and undeveloped parcels are located north and south of the Site. The NHBB property and the adjacent undeveloped parcels to the north and south are located within a Business/Industrial District. Facilities and uses permitted within a Business/Industrial District are diverse and include: industrial, warehousing, storage, distribution, lodging, conference, assisted living, recreational, public, and if associated with a permitted principal business use, residential. The entire Site and adjacent properties lie within a Groundwater Protection Overlay Zone that has been established by the Town of Peterborough.

Future land use assumptions for the Site and surrounding areas are based on current uses and potential future uses permitted under existing Peterborough zoning ordinances.

Additional description of the Site can be found in Section 1 of the September 2009 *Focused Feasibility Study* (FFS).

2. SITE HISTORY AND CONTAMINATION

The South Municipal Water Supply Well was installed in 1952 and reportedly yielded up to 500,000 gallons per day of potable water to the Town of Peterborough until it was shut down on December 2, 1982. Use of the South Well was discontinued after sampling by the New

Record of Decision Amendment

Part 2 – The Decision Summary

Hampshire Water Supply and Pollution Control Commission (NHWSPPC) indicated volatile organic compounds (VOCs) in the well.

In 1983, the area surrounding the South Well was inspected and ranked according to the Hazard Ranking System and in 1984 the Site was added to the National Priorities List (NPL). A 1984 and 1985 NHWSPPC hydrogeological investigation characterized the South Well aquifer and determined a plume of contaminated groundwater extended from the NHBB property to the vicinity of the South Well. Subsequent investigations confirmed the NHBB manufacturing facility as the source of the VOCs.

A detailed history of Site activities prior to the 1989 ROD can be found in Section 1 of the April 1989 *Remedial Investigation Report*. **Figure 2** shows the approximate location of the groundwater VOC plume originating from the northeast corner of the NHBB manufacturing facility, as inferred from 2007 and 2008 analytical data.

NHBB began manufacturing precision ball bearings at the Peterborough facility in 1956 in what is currently the southern end of the existing manufacturing building. The original facility has expanded, generally to the north and west, through subsequent building modifications in 1960, 1966, 1978, 1980, and 2004. From 1956 to 1991, NHBB used a variety of chlorinated solvents, including tetrachloroethene (PCE), trichloroethene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA) as pure products or mixtures for parts washing and degreasing operations. The presence of chemicals in soil and groundwater at the Site has been attributed to releases of solvents used by NHBB to the environment via former drainage outfalls, maintenance activities such as floor washing, vessel breaches, and past disposal practices.

Data indicates PCE, TCE, 1,1,1-TCA, 1,1-dichloroethene (1,1-DCE), and 1,1-dichloroethane (1,1-DCA) are the primary chemicals of concern at the Site. Common PCE breakdown products, including cis-1,2-dichloroethene (cis 1,2-DCE), trans-1,2-dichloroethene (trans 1,2-DCE), and vinyl chloride (VC), may also be present. 1,4-dioxane, a co-solvent used to stabilize 1,1,1-TCA based degreaser products, has also been detected in groundwater samples collected from the Site and is a COC (along with the identified PCE and TCE breakdown products) for the Site.

NHBB signed an Administrative Order by Consent with the EPA in 1986 to conduct a remedial investigation/feasibility study (RI/FS) to characterize the Site and to develop and evaluate options for remedial action. EMTEK, Inc. completed the original RI/FS in 1989 and a detailed history of Site activities can be found in Section 1 of the April 1989 *Remedial Investigation Report*. On September 27, 1989, the EPA issued the ROD for the Site that identified the original selected remedy for the Site.

An overview of the RI is presented in Section 2 of the July 1989 FS and the significant findings from the RI are summarized in the 1989 ROD. In general, the 1989 RI determined:

- soil in the area of NHBB contains VOCs due to historic releases from the manufacturing facility;

Record of Decision Amendment

Part 2 – The Decision Summary

- subsurface soil in the area of the northeast corner of the NHBB facility (GZH-4 well cluster area) contains the highest concentrations of VOCs and contributes to groundwater contamination as a source area;
- groundwater at the Site is primarily impacted by chlorinated hydrocarbons, including PCE, TCE, and 1,1,1-TCA;
- the highest VOC concentrations in groundwater were present near the northeast corner of the NHBB manufacturing facility (GZH-4 Source Area);
- wetlands located east and northeast of NHBB were impacted by historic releases from the facility; and
- sediments in the wetlands and at several former NHBB drainage outfalls contained polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and elevated chrome, copper, and zinc concentrations.

3. 1989 ROD SELECTED REMEDY

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. In accordance with these statutory requirements, the 1989 FS identified, assessed, and screened a range of technologies for the Site that were combined into source control and management of migration alternatives. Each alternative was then evaluated and screened in Section 4 of the 1989 FS.

The alternatives retained for detailed analysis are described in the 1989 ROD. With respect to source control, twelve alternatives were retained in which treatment that reduces the toxicity, mobility, or volume of the hazardous substances is a principal element. These included alternatives that employ treatment to address principal threats, alternatives that involve little or no treatment but provide protection through engineering or institutional controls, and a no action alternative. With respect to management of migration, seven alternatives were retained that could address groundwater contaminants that have migrated from the vicinity of the NHBB facility.

The 1989 ROD selected remedy for the Site included source control, management of migration, and additional components. Remedial action objectives for soil, sediments, and groundwater and target cleanup levels for soil and groundwater were included in the 1989 ROD to guide the remedy design and measure the success or failure of the selected remedy.

Source Control Component

- Installation and operation of an in-situ vacuum extraction system (VES) to remove VOCs from Site soils located above the water table that exceed target cleanup levels.
- Excavation and/or dredging with dewatering of sediments from Site wetlands with PCBs or PAHs that exceed target cleanup levels.

Record of Decision Amendment Part 2 – The Decision Summary

Migration Management Component

- Groundwater extraction and treatment of the VOC contaminant plume from the NHBB area (including the GZH-4 Source Area) and the dilute plume located east of Route 202, with air stripping and carbon columns for air emission control. The extracted groundwater will be treated onsite to reduce contaminant levels to drinking water standards prior to discharge onsite, and the groundwater extraction/discharge system for the NHBB area and the dilute plume will be designed to prevent the migration of contaminated groundwater into uncontaminated portions of the aquifer and to create hydraulic barriers to plume movement. One hydraulic barrier would be created between highly contaminated groundwater in the NHBB area and the dilute plume area, so that the portion of the aquifer affected by the dilute plume could be used independent of the restoration of the NHBB area. The second hydraulic barrier would be created between the dilute plume area and the South Municipal Well, to permit restricted use of the South Well prior to full attainment of groundwater target cleanup levels in the dilute plume.

Additional Components

- Site wetlands restoration to original conditions following completion of remedial activities to excavate and/or dredge contaminated sediments.
- Long-term groundwater monitoring to: determine contaminant reduction over time; evaluate the effectiveness of the remedial action and attainment of groundwater target cleanup levels; and ensure treated effluent does not exceed target cleanup levels. Modifications to the remedial action will be considered if the monitoring program shows groundwater will not attain the target levels within the time specified or the remedy is not adequately reducing risks to human health or the environment.
- Institutional controls, including restrictions on the use of the South Municipal Well, to ensure that groundwater in the zone of contamination will not be used as a drinking water source until target cleanup levels are met.
- As required by law, no less often than every five years after the initiation of the selected remedial action that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, EPA shall review such action. EPA shall also evaluate risk posed by the Site at the completion of the remedial action.

4. CHANGES TO THE 1989 ROD SELECTED REMEDY

Between July 1990 and January 1993, extensive pre-design investigations were undertaken and the design of the selected remedy was finalized. As a result of obtaining more detailed technical information during these pre-design investigations, the EPA issued an Explanation of Significant Differences (ESD) on May 6, 1993, to document and describe the nature of the significant

Record of Decision Amendment

Part 2 – The Decision Summary

changes between the remedy described in the 1989 ROD and the remedy to be implemented. The 1993 ESD modified the source control and migration management components of the 1989 ROD selected remedy, principally for air emission controls and sediment excavation.

The 1993 ESD specified that remediation of wetland sediments via excavation alone, without dredging, was appropriate and that a small area of contaminated sediments would be left in place and monitored. The 1993 ESD also presented the following differences: 1) implement air sparging in conjunction with the VES for as long as 15 years to enhance the extraction and treatment of contaminated groundwater; 2) allow natural attenuation of the leading edge of the dilute plume; 3) remove the requirement for air emissions controls on the groundwater extraction and treatment system; and 4) defer the remediation of site soils to achieve target cleanup levels until two years after the completion of air sparging, which may operate for up to 15 years.

The groundwater extraction and treatment system and in-situ VES commenced operations in 1994. After reviewing quarterly groundwater sampling data over the first two years of operation and considering changes to the Site conceptual model and the application of remedial technologies since the 1989 ROD was issued, the EPA issued a second ESD, which included a Technical Impracticability (TI) Evaluation, on February 3, 1997.

The 1997 ESD and TI Evaluation was based on the technical impracticability, from an engineering perspective, to restore the portion of contaminated groundwater affected by dense non-aqueous phase liquids (DNAPLs) to drinking water quality in a reasonable timeframe. The TI Evaluation concluded DNAPLs are present at the Site and calculated an average time to remediate a portion of the aquifer near the northwest corner of the NHBB building that contains DNAPLs, the GZH-4 Source Area, to a concentration of 15 mg/L was 108 years. Remediation to groundwater target cleanup levels would be even longer.

The 1989 ROD presented an estimate of 19 to 32 years to achieve groundwater target cleanup levels on the NHBB property, with caveats. One such caveat was the presence of DNAPLs may lengthen the time necessary to meet groundwater target cleanup levels. A second was that modifications to the remedial action would be considered if groundwater does not attain the target cleanup levels within the period of time specified or if the remedy is not adequately reducing risks posed by exposure to Site contaminants.

EPA's reevaluation, as documented in the 1997 ESD and TI Evaluation, indicated certain applicable or relevant and appropriate requirements (ARARs) may not be attainable for more than a century because of hydrogeologic and contaminant related factors that limit the effectiveness of groundwater remediation at the Site. On the basis of this information, EPA invoked the TI Waiver provided by CERCLA for groundwater ARARs specified in the 1989 ROD for the portion of the overburden and bedrock aquifers located within the TI Waiver Area shown in **Figure 2**, which includes substantially all of the NHBB property surrounding and downgradient of the NHBB building.

Record of Decision Amendment

Part 2 – The Decision Summary

As a direct result of waiving the requirement to meet the groundwater target cleanup levels within the TI Waiver Area, the 1997 ESD and TI Evaluation modified multiple elements of the 1989 ROD selected remedy:

Vacuum Extraction

- Continued operation of the in-situ VES was no longer required as a result of the 1997 ESD and TI Evaluation and it was discontinued in 1997. Since no soil contact threat was identified, the 1989 ROD specified VES installation and operation solely to eliminate the potential migration of contaminants from Site soils into groundwater at levels exceeding groundwater cleanup target levels. The areas of the Site specified in the 1989 ROD for VES operation are located within the TI Waiver Area.

Air Sparging

- The 1997 ESD and TI Evaluation no longer required air sparging. Technical problems encountered with attempts to implement air sparging, as specified in the 1993 ESD, prevented any operation of the technology at the Site.

Groundwater Extraction and Treatment

- The 1997 ESD and TI Evaluation changed pumping rates and extraction well configurations to hydraulically contain from the rest of the aquifer, not extract and treat, the NHBB area plume located within the TI Waiver Area.

Long-term Groundwater Monitoring

- Monitoring of groundwater quality and elevations were continued to determine whether contaminated groundwater within the TI Waiver Area is hydraulically contained or if adjustments to the extraction system are necessary.

Institutional Controls

- To further ensure the protectiveness of the remedy, the 1997 ESD and TI Evaluation required a deed restriction be placed on the NHBB property to prohibit groundwater extraction for purposes other than the remedial action, unless the extracted groundwater meets or is treated to appropriate standards in effect at the time of extraction and the extraction does not adversely affect the remedial action.

5. 1989 ROD REMEDY IMPLEMENTATION

Site sediments and wetlands were addressed during a 1994 remedial action. 1,996 tons of sediments containing PCB or PAH concentrations above cleanup levels were removed from wetland areas and transported to a Resource Conservation and Recovery Act (RCRA) Subtitle D

Record of Decision Amendment

Part 2 – The Decision Summary

landfill for disposal. 3,136 cubic yards of approved backfill materials and plants were used to backfill excavated areas and restore original grades and wetlands. Details are presented in the 1995 *Remedial Action Report*.

Construction of the groundwater extraction and treatment system began in 1993 and the system became operational in 1994. The in-situ VES began operation in 1994 but ceased operation in 1997 after the second ESD was issued and the existing pump and treatment system was revised to hydraulically contain high concentrations of the VOC plume within the TI Waiver Area. Groundwater contaminated with lower dissolved-phase VOC concentrations and located outside the NHBB property and TI Waiver Area continued to be extracted and treated.

A deed restriction for the NHBB property was recorded in the Hillsborough County Registry of Deeds on October 21, 1999 to prohibit groundwater extraction for purposes other than the remedial action, as required by the 1997 ESD. The deed restriction and existing institutional controls regulate the pumping or use of groundwater within the Site and adjacent properties.

Monitoring of groundwater quality and elevations has continued throughout the remedy implementation process and extraction wells have been taken on and offline and pumping rates adjusted depending on system performance. The primary containment wells located at the TI Waiver boundary have experienced specific capacity losses due to persistent biofouling of well screens and probable biofouling of sand packs and surrounding unconsolidated deposits. Although NHBB and its contractors have implemented a regular maintenance program approximately every six months, only temporary increases in extraction well capacities have been observed following well cleaning and maintenance and the well capacities have generally continued to decrease over time, with reduced flow rates occurring approximately three months after pump cleaning. Biofouling in and around the extraction wells is likely limiting the hydraulic containment system's performance. Efforts associated with well rehabilitation and extraction and treatment system maintenance are summarized in the annual groundwater monitoring reports.

The Town of Peterborough and NHBB initiated two pumping tests on the South Municipal Well to evaluate the potential for returning the well to service. The first pumping test was a short-term, 63 day test that was completed in 1999. Groundwater monitoring associated with this test indicated the aquifer met cleanup standards in the vicinity of the South Well. The second pumping test was a long-term, two year test that commenced on October 6, 2003 and was terminated nearly 16 months later on February 2, 2005, following the detection of VOCs at concentrations above groundwater cleanup levels in monitoring wells located near the South Well. Results from the long-term pumping test demonstrated the hydraulic containment system at the TI Waiver boundary was not capable of containing the groundwater plume when the South Well operates for extended periods.

The detailed findings from the long term pumping test are contained in the *Annual Groundwater Monitoring Report for Year 11* (spring 2004 to winter 2005).

Record of Decision Amendment Part 2 – The Decision Summary

C. BASIS FOR THE ROD AMENDMENT

An Amendment to the 1989 ROD is necessary because a fundamental change is needed to the source control and migration management components of the original selected remedy to meet the remedial action objectives (RAOs) for the Site. This ROD Amendment documents the basis for the fundamental change, which will change the existing remedy for a portion of the Site within and adjacent to the NHBB property.

The remedy selected in this ROD Amendment does not change the long-term groundwater monitoring, institutional controls, or five year reviews required in the 1989 ROD. Nor does this ROD Amendment change the original cleanup approach, as modified by the 1993 ESD, to allow natural attenuation of the dilute plume, provided there is sufficient reduction in VOC loading to groundwater from upgradient source areas and capture and treatment of any remaining contaminant plume at the TI Waiver boundary. This ROD Amendment does not affect the TI Waiver that accompanied the 1997 ESD, nor does it change the location or size of the TI Waiver Area.

From 1994 to 1997, groundwater pump and treat and vapor extraction systems designed to achieve the RAOs identified in the 1989 ROD were fully operational at the Site. In response to the 1997 ESD and TI Evaluation, the remedy was revised to hydraulically contain the contaminated plume located on the NHBB property within the TI Waiver Area and the VES was discontinued.

Due to the inability of the existing hydraulic containment system to meet the original RAOs for the Site, as demonstrated by the 2003-2005 long-term pumping test results, additional investigations into the location and extent of contaminant source areas were performed so alternative remedies capable of reducing contaminant source areas could be studied. Additional investigations included a source area delineation performed from 2006 to 2007 and supplemental soil/groundwater sampling accompanied by vertical groundwater profiling in 2008.

The Third Five-Year Review Report prepared for the Site by the EPA in 2008 concluded the remedy was not functioning as intended by the 1989 ROD and subsequent ESDs. EPA determined the remedy was not protective of human health or the environment in part because it could not capture all portions of the contaminated groundwater while the South Municipal Well was operating and because groundwater outside of the TI Waiver Area is above drinking water standards. The Third Five-Year Review Report also noted that there was insufficient data to evaluate whether the remedy was protective of the potential vapor intrusion (VI) pathway.

The additional investigations performed between 2006 and 2008 primarily revealed:

- elevated concentrations of VOCs, including DNAPLs, are still present in soil and groundwater near the northeast corner of the NHBB facility (GZH-4 Source Area);

Record of Decision Amendment Part 2 – The Decision Summary

- elevated VOCs still exist in soil and groundwater between the NHBB facility and Route 202;
- elevated concentrations of dissolved VOCs, including DNAPLs, are present along and north of the NHBB property boundary and outside the TI Waiver Area, in a newly identified area approximately 250 feet east-northeast of the GZH-4 Source Area (VP-17 Source Area);
- elevated VOCs are distributed throughout the entire thickness of the aquifer, with the highest concentrations generally located within the upper 45 feet of saturated thickness; and
- low VOCs are present in groundwater located east of Route 202 (the dilute plume).

Results from these supplemental investigations were used to prepare the 2009 *Focused Feasibility Study* (FFS) that identified and evaluated new remedial alternatives for source mass reduction and dissolved phase contaminant plume management at the Site. The FFS report is organized to follow the general format presented in the 1988 EPA RI/FS Guidance and supports this ROD Amendment.

1. UPDATED NATURE AND EXTENT OF CONTAMINATION

(a) Soil

The highest concentrations of VOCs in Site soil remain in the vicinity of the northeast corner of the NHBB building, the GZH-4 Source Area. DNAPL and elevated soil concentrations in the GZH-4 Source Area suggest that surface or near surface releases have migrated by gravity through the soil column into the saturated zone. Near surface releases are attributed to a pipe constructed of vitrified clay that is oriented south to north under the eastern portion of the NHBB plant and leads to former outfall 003A, shown on **Figure 1**. Former outfall 003A discharged north of the NHBB building into the unnamed creek present along the northern edge of the NHBB property. Elevated VOC concentrations in soil were detected above an area where DNAPLs were detected in groundwater from GZH-4M. Elevated VOC concentrations were also detected in soil samples collected near former outfall 002, also shown on **Figure 1**.

The April 1989 *Remedial Investigation Report*, 1991 *Pre-design Report*, 1991 *Vacuum Extraction Pilot Study Report*, and 1993 memorandum containing the results of the additional soil boring (phase IV) program present information on the extent of soil contamination at the Site. Remediation of the aforementioned source and outfall areas was specified in the 1989 ROD to reduce VOCs in soil to levels that would eliminate the potential migration of contaminants from soil to groundwater at concentrations exceeding groundwater cleanup levels. A vacuum extraction system was operated at the Site from October 1994 until the 1997 ESD allowed its termination.

Soil samples for laboratory analysis have not been collected from the newly identified VP-17 Source Area to date. However, elevated concentrations of dissolved VOCs, including DNAPLs,

Record of Decision Amendment

Part 2 – The Decision Summary

are present in this area. The actual soil treatment areas and volumes will be defined during the pre-design activities.

(b) Groundwater

Groundwater beneath the Site is impacted by a variety of VOCs including PCE, TCE, and 1,1,1-TCA. Investigations have confirmed the highest VOC concentrations in groundwater are found in the GZH-4 Source Area. The RI reported the entire saturated thickness of the aquifer proximate to the GZH-4 Source Area contains VOCs in groundwater greater than 10,000 ug/L and DNAPLs were confirmed at depths of approximately 50 feet. Analytical testing of a DNAPL sample collected from the GZH-4U monitoring well in 2006 identified the DNAPL as PCE.

Groundwater in the VP-17 area along the northern edge of the NHBB property was originally investigated as part of the 2006 to 2007 source area delineation to identify the northern boundary of VOC concentrations observed in a well cluster located approximately 50 feet south. Based on the elevated sampling results observed at the location, additional groundwater samples were collected from additional locations in the VP-17 area during 2008. Results from the 2008 sampling completed in the VP-17 area are included in the 2009 *Focused Feasibility Study*.

Investigations reveal total VOCs in groundwater within the VP-17 area approach 27,000 ug/L. The presence of DNAPL is suspected in the VP-17 area between 15 and 40 feet below ground surface. Groundwater generally occurs 10 to 13 feet below ground surface in the area. It is unknown if VOC concentrations observed in groundwater in the VP-17 area are contiguous with or isolated from the groundwater plume, as no sample points have been located south or southwest of VP-17. While it has not been determined if contamination located in the VP-17 area originated from the main body of the plume or other release mechanisms, residual DNAPL, groundwater, and possibly soil provide a contaminant source mass.

PCE has been and continues to be the most frequently detected and the most highly concentrated VOC at the Site and the main component of the groundwater plume. The high concentrations of VOCs in the GZH-4 and VP-17 Source Areas diffuse easterly as the VOCs dissolve into groundwater and migrate along groundwater flow paths to the east/northeast. Site data indicates as groundwater passes through source areas where VOCs are present in Site soils or groundwater, especially areas with residual DNAPLs, dissolution of VOCs from the source areas occurs and the dissolved phase plume elongates parallel to the direction of groundwater flow, as shown in **Figure 2**.

It is unknown if the concentrations of TCE near the NHBB building are a result of a release of TCE or from the degradation of PCE. Although TCE breakdown products such as 1,1-DCA, 1,1-DCE, trans-1,2-DCE, and vinyl chloride have been detected in samples collected from source areas, the frequency of breakdown product detections and their concentrations imply limited degradation of the groundwater plume is occurring. Redox potentials measured during the 2006 to 2007 source area delineation indicate ranges supportive of anaerobic degradation and outside

Record of Decision Amendment

Part 2 – The Decision Summary

the optimal range for reductive dechlorination, which supports the conclusion that limited plume degradation is occurring.

Contaminant source areas are further defined, distribution trends are discussed, and geochemical results are presented in the 2007 *Source Area Delineation Summary Report*. The data contained in the 2007 report provide the basis for the conceptual treatment scenarios for source mass reduction in the GZH-4 and VP-17 Source Areas that are identified in the 2009 FFS. The actual groundwater treatment areas and volumes will be further defined during the pre-design activities.

Natural attenuation of the dilute plume is still occurring and is expected to continue, provided there is sufficient reduction in VOC loading to groundwater from upgradient source areas and capture and treatment of any remaining contaminant plume at the TI Waiver boundary.

(c) Sediments

VOCs, PAHs, PCBs, and metals were detected in sediment samples collected from the Site between 1986 and 1988 as part of the RI. VOCs in sediments were attributed to leaching from contaminated soils or discharges to the wetlands. The highest concentrations of PAHs, PCBs, and metals were detected near the terminus of Outfall 001 (see **Figure 1**), which serviced an area of the NHBB manufacturing plant where cutting oils, machine oils, or transformer oils may have incidentally washed into floor drains connected to the outfall. Lesser concentrations of PAHs and PCBs were also detected proximate to the terminus of Outfall 002.

Due to their low solubility and high affinity to sorb onto soils and sediments, transport of PAHs and PCBs primarily occurs via surface water flow and sediment deposition. Flow channels within the wetlands and former drainage ditches likely controlled the migration and distribution of PCBs and PAHs within the wetlands. Sediment traps within the surface water system confirmed PCBs at the confluence of the wetlands and the Contoocook River; however, PCBs were not detected downstream of the confluence.

A total of 1,996 tons of sediments were removed from areas within the wetlands that had PCB and PAH concentrations above cleanup levels or elevated metals concentrations. Excavated sediments were transported to the Turnkey Landfill in Rochester, NH for disposal. 3,136 cubic yards of approved backfill materials and plants were used to fill excavated areas and restore original grades and wetlands.

Sediment removal and wetlands restoration activities were completed in October 1994. Details of these activities are presented in the 1995 *Remedial Action Report*.

(d) Surface Water

Low concentrations of VOCs were detected in surface water samples collected from the edge of the wetlands during the RI. VOCs found within the surface water of the wetlands may be attributed to outfall discharges, surface water runoff, groundwater discharge, and/or VOCs

Record of Decision Amendment

Part 2 – The Decision Summary

leaching from soil proximate to the wetlands. Potentiometric surface data has indicated the wetlands discharge to the aquifer; however, there may be seasonal variation to the losing or gaining status between groundwater and surface water at the wetlands.

Surface water remediation was not specifically addressed in the 1989 ROD. However, sediment removal and wetlands restoration activities, in-situ vacuum extraction system operation, and the implementation of groundwater extraction and treatment have indirectly promoted the restoration of surface water quality in the wetlands.

(e) Vapor Intrusion

Indoor air sampling for a phase I vapor intrusion (VI) evaluation was performed in 2009 to evaluate whether the existing remedy is protective of the VI pathway. Results from the 2009 indoor air sampling event indicate indoor air concentrations of PCE and TCE detected in the NHBB building and a downgradient commercial building (shown on **Figure 2**) are greater than the New Hampshire Department of Environmental Services Commercial Indoor Air Screening Levels. Additional indoor air sampling is planned to verify the phase I results and provide data for a downgradient residential building that was not sampled in 2009.

Findings from the phase I VI evaluation are presented in the December 2009 *Results of the Indoor Air Sampling Event* letter report.

2. RISK ANALYSIS

As summarized below and detailed in the Baseline Risk Assessment presented in Section 5 of the 1989 *Remedial Investigation Report*, the human health risks at the Site were evaluated quantitatively while the environmental threat to environmental receptors was discussed qualitatively. No additional risk update was performed for this ROD Amendment since the exposure pathways (excluding the potential VI pathway noted above) and risks from the 1989 RI Report have not changed or were addressed through implementation of the remedial actions undertaken at the Site to date.

(a) Human Health Risks

The 1989 ROD included an assessment of the potential threats to human health in the study area. Human health risks were evaluated for ingestion of groundwater, direct contact with soils, inhalation of airborne contaminants, direct contact with surface water and sediments, and ingestion of fish. Based on toxicity, concentration, frequency of detection, and mobility and persistence, 16 Contaminants of Potential Concern (COPCs) were selected for further evaluation from more than 40 contaminants identified at the Site during the remedial investigation. Based on the Human Health Risk Assessment performed as part of the RI and presented in the 1989 ROD, the only pathways that exceeded EPA's acceptable cancer risk range and/or a hazard quotient of concern were ingestion of groundwater and direct contact with sediments in the wetland area.

Record of Decision Amendment

Part 2 – The Decision Summary

Ingestion of groundwater was evaluated for three scenarios: 1) ingestion of water pumped from the South Well with contaminant concentrations equivalent to those prior to shutdown of the well; 2) ingestion of groundwater from a hypothetical off-property residential well intersecting the contaminant plume; and 3) ingestion from a hypothetical on-property residential well. The incremental lifetime cancer risk estimated for ingestion of water pumped from the South Well was 5×10^{-5} . The incremental lifetime cancer risks for the average and maximum concentrations in a hypothetical off-property residential well were 2×10^{-3} and 2×10^{-2} . For non-carcinogenic effects, the hazard quotient was greater than 1 only for the maximum concentration scenario. The major contributors to cancer risk were PCE and vinyl chloride, while the major contributor to non-cancer risk was PCE. The incremental lifetime cancer risks for the average and maximum concentrations in a hypothetical on-property residential well were 3×10^{-2} and 4×10^{-1} . The latter extremely high risks reflect a worst case scenario for ingestion of groundwater from the most contaminated area of the Site.

The only other exposure route judged to be of potential human health concern was direct contact with sediments in the wetland area. The exposure scenario evaluated dermal absorption and incidental ingestion of sediment by children between the ages of six and 15 who would visit the Site 50 times annually for ten years. For the average and maximum exposure scenarios it was assumed that the child contacts the average or maximum contaminant concentrations, respectively, during each visit. The incremental lifetime cancer risks were 4×10^{-5} and 2×10^{-4} for the average and maximum exposure scenarios. PAHs were the major contributors to the cancer risk. There was no potential for non-cancer risks greater than a hazard quotient of one.

Although the groundwater on and around the Site is not currently used for drinking water, this aquifer was used as a drinking water supply until contamination from the Site was discovered. Therefore, the aquifer is still classified as an existing source of drinking water. Although data gathered since the 1989 ROD was issued demonstrate that contaminant mass is reduced, contaminant levels still exceed drinking water standards, and ingestion of groundwater continues to pose a risk higher than EPA acceptable risk criteria consistent with the risks summarized above. This conclusion was supported by the 2009 Focused Feasibility Study, which also identified a potential concern due to potential exposure to site-related contaminants via migration of VOCs from the subsurface into overlying structures, including an off-site commercial building and an off-site residence. This potential exposure pathway is currently being investigated. The human health risks associated with direct contact with sediments were eliminated by the 1994 removal of wetland sediments with PCB and PAH concentrations above cleanup levels.

(b) Ecological Risks

Potential ecological risk of contaminants in sediment was evaluated qualitatively by evaluating the potential for adverse effects of PAHs and PCBs in sediment to aquatic organisms. This evaluation used organic carbon partitioning analysis, octanol:water partition coefficients, and site-specific organic carbon data to predict average and maximum PCB pore water concentrations of 0.005 ug/L and 0.4 ug/L. It was concluded that adverse effects were possible

Record of Decision Amendment

Part 2 – The Decision Summary

based on comparison with EPA's 0.014 ug/L chronic water quality criterion, combined with potential additional toxicity due to the PAHs and metals associated with the sediment contamination. In addition, bioaccumulation and biomagnification of PCBs, PAHs, and metals were of concern but not quantified due to limited data. Of particular concern was the potential for effects on migratory birds ingesting aquatic invertebrates, emergent insects and sediments contaminated with PCBs. The potential for these risks was eliminated by the sediment removal and wetlands restoration activities completed in 1994.

D. DESCRIPTION OF CLEANUP ALTERNATIVES CONSIDERED

The 2009 *Focused Feasibility Study* summarizes the findings of the remedial alternative evaluation process for treatment of the GZH-4 and VP-17 Source Areas that currently remain at the Site and for treatment of the groundwater plume that continues to migrate from the NHBB property to locations outside the TI Waiver Area (**Figure 2**).

Five comprehensive treatment scenarios (CTSs) representing a combination of various remedial alternatives were developed for the Site and are presented in detail in the FFS. The remedial alternatives included as part of each CTS were evaluated based in part on their efficacy to contain and destroy source mass. The evaluation of containment options included bench-scale treatability testing and the detailed analysis of a permeable reactive barrier (PRB) remedial alternative capable of degrading the VOCs in groundwater as the contaminant plume flows through a sand/iron mixture emplaced from just below the ground surface and into the till layer that overlies bedrock. The evaluation of source area treatment options identified electrical resistance heating (ERH) using three phase systems for detailed analysis of the in-situ thermal treatment remedial alternative for source area soil and groundwater in saturated and unsaturated conditions; and in-situ chemical reduction by applying an emulsified oil substrate with pH buffering for detailed analysis of the in-situ bioremediation remedial alternative to support long-term anaerobic biodegradation of contaminants.

The remedial alternatives presented as part of each CTS in the FFS were specified based on the current understanding of the nature and extent of contamination at the Site. This ROD Amendment utilizes this specific information for cost estimating and conceptual design purposes only. It does not prescribe the specific type, location, areal length (for PRB), or duration of the in-situ thermal, in-situ bioremediation, or PRB process options that will be implemented. The specific remedial process options will be determined using pre-design findings. This provides the greatest flexibility with using new information and data as it becomes available to optimize the design of the selected remedy in order to achieve all of the 2010 ROD Amendment RAOs in the shortest time practicable.

The five CTSs presented in the FFS and the specific remedial alternatives included with each (and modified as noted) are summarized below. All would require operational and performance monitoring to ensure their effectiveness in achieving the 2010 ROD Amendment RAOs for the Site. Except for CTS 1, No Further Action, all CTSs would utilize more aggressive (>1,000

Record of Decision Amendment

Part 2 – The Decision Summary

ug/L) in-situ thermal treatment at the VP-17 Source Area than at the GZH-4 Source Area (>10,000 or >100,000 ug/L treatment) because the VP-17 Source Area is located adjacent to and outside of the TI Waiver Area, while the GZH-4 Source Area is located within the TI Waiver Area. Depending on the specific treatment methods implemented at the Site, the estimated aquifer volume to receive treatment ranges from 45,000 to 80,000 cubic yards.

CTS 1: No Further Action (Alternative 0¹) and Institutional Controls

Under CTS 1, no further action would occur to remove, control, mitigate, or minimize exposure to contaminated source materials or groundwater, other than continued operation of the current groundwater extraction/containment system and continued implementation of institutional controls. The remedial timeframe to achieve RAOs is indefinite, as RAOs will not be met using this CTS. The net present value (2008 dollars) of CTS 1 is \$3,577,170.

The No Further Action alternative provides a baseline against which other CTSs are compared.

CTS 2: In-Situ Thermal Treatment (>10,000 ug/L zone (Alternative 6) & >1,000 ug/L at VP-17 zone (Alternative 15)), Permeable Reactive Barrier (Alternative 2A), and Institutional Controls

Note that this is a modified CTS 2 from what is presented in the FFS and in the Proposed Plan. Alternative 15, not 15A, is presented in this ROD Amendment as the in-situ thermal treatment alternative at the VP-17 zone due to the selection of Alternative 15 after the evaluation of alternatives. Associated costs for CTS 2 reported in this ROD Amendment are based on Alternative 15 and not 15A.

CTS 2 consists of in-situ thermal treatment of both the GZH-4 Source Area with total select VOCs >10,000 ug/L and the VP-17 Source Area with total select VOCs >1,000 ug/L. An estimated 500 foot long PRB would be installed to provide passive containment and treatment of contaminated groundwater, and institutional controls would continue to be implemented. The estimated remedial timeframe to achieve RAOs is greater than 2 years for soil and greater than 10 years for groundwater. The net present value (2008 dollars) of CTS 2 is \$14,520,405.

CTS 3: In-Situ Thermal Treatment (>10,000 ug/L zone (Alternative 6)), In-Situ Bioremediation (>1,000 ug/L at VP-17 zone (Alternative 19C)), Permeable Reactive Barrier (Alternative 2A), and Institutional Controls

CTS 3 includes in-situ thermal treatment of the GZH-4 Source Area with total select VOCs >10,000 ug/L and in-situ bioremediation of the VP-17 Source Area with total select VOCs >1,000 ug/L. An estimated 500 foot long PRB would be installed to provide passive containment and treatment of contaminated groundwater, and institutional controls would continue to be implemented. The remedial timeframe to achieve RAOs is unknown, as soil RAOs are unlikely to be met outside of the TI Waiver Area due to the likelihood that residual

¹ The Alternative numbers provided herein as part of each CTS description are taken directly from the FFS.

Record of Decision Amendment Part 2 – The Decision Summary

DNAPL remains at VP-17 after in-situ bioremediation is completed. The net present value (2008 dollars) of CTS 3 is \$13,405,720.

CTS 4²: In-Situ Thermal Treatment (>100,000 ug/L zone modified (Alternative 3A) & >1,000 ug/L at VP-17 zone (Alternative 15)), In-Situ Bioremediation (NHBB property >1,000 ug/L zone outside of thermal treatment zone (Alternative 19D)), Permeable Reactive Barrier (Alternative 2B), and Institutional Controls

Note that this is a modified CTS 4 from what is presented in the FFS and in the Proposed Plan. Alternative 15, not 15A, is presented in this ROD Amendment as the in-situ thermal treatment alternative at the VP-17 zone due to the selection of Alternative 15 after the evaluation of alternatives. Associated costs for CTS 4 reported in this ROD Amendment are based on Alternative 15 and not 15A.

CTS 4 would apply in-situ thermal treatment to both the GZH-4 Source Area with total select VOCs >100,000 ug/L (modified as shown in **Figure 3**) and the VP-17 Source Area with total select VOCs >1,000 ug/L. The NHBB property would be further treated under CTS 4 via in-situ bioremediation of areas with total select VOCs >1,000 ug/L that are outside of the GZH-4 thermal treatment zone. An estimated 400 foot long PRB would be installed to provide passive containment and treatment of contaminated groundwater, and institutional controls would continue to be implemented. The estimated remedial timeframe to achieve RAOs is greater than 2 years for soil and greater than 10 years for groundwater. The net present value (2008 dollars) of CTS 4 is \$13,634,600.

CTS 5: In-Situ Thermal Treatment (>100,000 ug/L zone modified (Alternative 3A)), In-Situ Bioremediation (>1,000 ug/L at VP-17 zone (Alternative 19C) and NHBB property >1,000 ug/L zone outside of thermal treatment zone (Alternative 19D)), Permeable Reactive Barrier (Alternative 2B), and Institutional Controls

CTS 5 would combine in-situ thermal treatment to the GZH-4 Source Area with total select VOCs >100,000 ug/L, modified as shown in the FFS Figure 10; with in-situ bioremediation of the VP-17 source area with total select VOCs >1,000 ug/L and in-situ bioremediation of the NHBB property with total select VOCs >1,000 ug/L that are outside of the GZH-4 thermal treatment zone. An estimated 400 foot long PRB would be installed to provide passive containment and treatment of contaminated groundwater, and institutional controls would continue to be implemented. The remedial timeframe to achieve RAOs is unknown, as soil RAOs are unlikely to be met outside of the TI Waiver Area due to the likelihood that residual DNAPL remains at VP-17 after in-situ bioremediation is completed. The net present value (2008 dollars) of CTS 5 is \$12,519,910.

² EPA's Selected Remedy.

**Record of Decision Amendment
Part 2 – The Decision Summary**

E. EVALUATION OF CLEANUP ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives. The nine evaluation criteria are grouped into the three categories presented below.

1. THRESHOLD CRITERIA

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

- **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.
- **Compliance with applicable or relevant and appropriate requirements (ARARs)** addresses whether or not a remedy will meet all federal environmental and more stringent state environmental and facility siting standards, requirements, criteria or limitations, unless a waiver is invoked.

2. PRIMARY BALANCING CRITERIA

The five primary balancing criteria are utilized to compare and evaluate the elements of alternatives that meet the threshold criteria to each other.

- **Long-term effectiveness and permanence** addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.
- **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the Site.
- **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.
- **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option from design through construction and operation.

Record of Decision Amendment

Part 2 – The Decision Summary

- **Cost** includes estimated capital and Operation and Maintenance (O&M) costs, as well as present-worth costs.

3. MODIFYING CRITERIA

The modifying criteria are used as the final evaluation of remedial alternatives, generally after EPA has received public comment on the RI/FS and Proposed Plan.

- **State acceptance** addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.
- **Community acceptance** addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS.

4. COMPARATIVE ANALYSIS

This section evaluates the five (5) comprehensive treatment scenarios developed in the FFS and considered for this ROD Amendment using the nine evaluation criteria.

Overall Protection of Human Health and the Environment

CTS 1 (No Further Action and Institutional Controls) would be the least protective of all the five alternatives considered. It would offer limited protection to human health and the environment by singularly maintaining existing institutional controls, no additional protections to human health and the environment would be implemented. Results of the Human Health Risk Assessment performed as part of the RI and presented in the 1989 ROD indicate the estimated incremental lifetime cancer risks for ingestion of groundwater pumped from the South Well was within EPA's acceptable cancer risk range 1×10^{-4} to 1×10^{-6} . However, the exposure scenario developed for the average and maximum risks associated with ingestion of groundwater from a hypothetical off-property residential well intersecting the contaminant plume were 2×10^{-3} to 2×10^{-2} . Potential risks from exposure to contaminated media would remain and not be reduced by CTS 1.

CTS 2 and CTS 4 are considered protective of potential risks to human health and the environment. They utilize active remedial actions that either destroy or remove VOCs from identified source areas and the aquifer in combination with maintaining institutional controls that restrict and regulate the pumping or use of groundwater on or near the Site until such time that RAOs for the Site are achieved.

While CTS 3 and CTS 5 would utilize some of the same remedial actions as CTS 2 and 4, in the VP-17 Source Area CTS 3 and CTS 5 would implement in-situ bioremediation instead of in-situ thermal treatment. Because the application of in-situ bioremediation at the VP-17 Source Area may have an increased likelihood of residual DNAPL remaining after treatment compared to in-

Record of Decision Amendment

Part 2 – The Decision Summary

situ thermal treatment, EPA considers CTS 3 and CTS 5 to be less aggressive approaches and thus less protective of human health and the environment than CTS 2 and CTS 4.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as “ARARs,” unless such ARARs are waived pursuant to CERCLA section 121(d)(4). This criterion must be met for a remedial alternative to be chosen as a final site remedy in accordance with CERCLA. Compliance with groundwater and soil ARARs is required in all areas located outside the TI Waiver area.

CTS 1 will not meet ARARs. CTS 3 and CTS 5 are unlikely to meet all ARARs and CTS 2 and CTS 4 will meet all ARARs.

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met.

CTS 2 and CTS 4 utilize in-situ thermal treatment to destroy contaminant mass from identified source areas, while CTS 3 and CTS 5 would utilize in-situ bioremediation instead of in-situ thermal treatment in the VP-17 Source Area. Bioremediation in the VP-17 Source Area may have an increased likelihood of residual DNAPL remaining after treatment. Cleanup levels outside the TI Waiver Area are unlikely to be met and residual risks will remain in the VP-17 Source Area after CTS 1 (No Further Action), CTS 3, and CTS 5, are implemented. Therefore, the aggressive treatment approaches offered by CTS 2 and CTS 4 offer increased long-term effectiveness compared to the other scenarios.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy. Alternatives CTS 2 and CTS 4 use more aggressive treatment approaches to destroy contaminants in-situ at each identified source area. The PRB component of all CTSs, except CTS 1, would capture and treat any remaining contaminant plume as it flows through it, further reducing the toxicity, mobility, and volume of contaminants. CTS 1 would provide modest VOC removal from groundwater through the extraction and treatment of water using the existing groundwater pump and treatment system. Because CTS 3 and CTS 5 use a less aggressive treatment approach in the VP-17 Source Area (or no action in the case of CTS 1), CTS 2 and CTS 4 will provide greater reduction in toxicity, mobility, and volume of contaminants through treatment compared to the other scenarios.

Record of Decision Amendment

Part 2 – The Decision Summary

Short-Term Effectiveness

Because existing institutional controls restrict current exposure to groundwater, there will be no short-term adverse effects to the community from exposure to groundwater during implementation of any of the CTSs. The scenarios that implement in-situ thermal treatment, CTS 2 and CTS 4, will have shorter remedial timeframes and less uncertainty regarding the degree and rate of contaminant reductions when compared to the less aggressive bioremediation alternative included in CTS 3 and CTS 5 or continued operation of the groundwater extraction and treatment system under CTS 1. Therefore, CTS 2 and CTS 4 are more effective in the short-term compared to the other scenarios. Potential short-term risks associated with implementation of all CTSs on the NHBB property (except CTS 1) are recognized, including risks to both employees and construction workers. These risks can be managed through the use of approved Health and Safety Plans.

Implementability

Each CTS is generally implementable from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are not expected to present obstacles.

Cost

Cost estimates for the CTSs are shown in **Table 1** below. The estimates presented in the table are based on the best available information at the time the 2009 FFS was prepared regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur as a result of new information and data collected during the actual engineering design.

The estimated net present value costs for each of the five CTSs range from \$3.6 million (CTS 1) to \$14.5 million (CTS 2). Capital costs and operation and maintenance (O&M) costs were developed at a conceptual level for the FFS; therefore, these costs have an expected accuracy of plus 50% to minus 30%.

Present worth cost estimates are used to evaluate remedial alternatives that occur over time by discounting all future costs to present day costs. The estimated net present values reported in the FFS and **Table 1** are in 2008 dollars and were calculated using a 7% discount rate over an assumed performance period of 30 years.

Detailed cost analyses for the individual remedial alternatives are presented in Appendix K of the 2009 FFS.

**Record of Decision Amendment
Part 2 – The Decision Summary**

**Table 1
Comprehensive Treatment Scenario Cost Estimates**

Cost Component²	CTS 1	CTS 2	CTS 3	CTS 4¹	CTS 5
Capital Costs					
Alternative 0	\$0				
Alternative 2A		\$4,181,230	\$4,181,230		
Alternative 2B				\$3,597,030	\$3,597,030
Alternative 3A				\$5,293,000	\$5,293,000
Alternative 6		\$7,429,740	\$7,429,740		
Alternative 15		\$1,876,070		\$1,165,880	
Alternative 19C			\$860,580		\$860,580
Alternative 19D				\$1,835,130	\$1,835,130
Subtotal	\$0	\$13,487,040	\$12,471,550	\$12,601,230	\$11,585,740
Present Worth of Future O&M Costs³					
Alternative 0	\$3,577,170				
Alternative 2A		\$438,160	\$438,160		
Alternative 2B				\$438,160	\$438,160
Alternative 3A				\$496,005	\$496,005
Alternative 6		\$496,005	\$496,005		
Alternative 15		\$99,200		\$1,876,070	
Alternative 19C			\$0		\$0
Alternative 19D				\$0	\$0
Subtotal	\$3,577,170	\$1,033,370	\$934,170	\$1,033,370	\$934,170
Total Net Present Value (2008 dollars)	\$3,577,170	\$14,520,405	\$13,405,720	\$13,634,600	\$12,519,910
Notes ¹ CTS 4 is EPA's selected remedy. ² Institutional Controls, a component of all CTSs shown, are not listed because there are no costs associated with maintaining them. ³ O&M costs are greatest for CTS 1 because they include continued operation and maintenance (including well rehabilitation) of the existing groundwater extraction, treatment, and hydraulic containment system; system compliance sampling; and routine groundwater sampling, analysis, and reporting. The estimated <i>annual</i> cost of the CTS 1 O&M activities is \$48,600.					

Record of Decision Amendment Part 2 – The Decision Summary

State/Support Agency Acceptance

The New Hampshire Department of Environmental Services has reviewed the May 2010 Proposed Plan and a draft of this ROD Amendment. The State of New Hampshire supports the proposed remedy changes as described in CTS 4.

Community Acceptance

Based on the comments received at the public meeting and public hearing, including comments provided by the responsible party, NHBB, the community and the Town of Peterborough are all supportive of the proposed remedy changes as described in CTS 4.

F. RATIONALE FOR THIS 2010 ROD AMENDMENT SELECTED REMEDY

Based on the results of the RI and subsequent investigations, an assessment of current data, and review of the 2009 FFS, EPA has selected comprehensive treatment scenario 4, CTS 4 (as modified above), as the selected remedy for this ROD Amendment.

As described in EPA's May 2010 Proposed Plan and presented in detail in the 2009 FFS, CTS 4 (as modified) will apply a combination of remedial technologies on and adjacent to the NHBB property that will: utilize in-situ thermal treatment and in-situ bioremediation of contaminated soil and groundwater; use a permeable reactive barrier to treat contaminated groundwater; maintain existing institutional controls; incorporate long-term monitoring; and require five-year reviews as long as waste remains in place. EPA believes CTS 4 (as modified) achieves the best balance among the nine criteria used to evaluate remedial alternatives.

By selecting CTS 4 (as modified) as the 2010 ROD Amendment selected remedy, EPA has selected a cleanup approach that ensures protectiveness of human health and the environment, attains all federal and state regulations, provides long-term and short-term effectiveness, is implementable, and reduces toxicity, volume, and mobility through treatment.

G. DESCRIPTION OF FUNDAMENTAL CHANGES BETWEEN THE 1989 ROD REMEDY AND THIS 2010 ROD AMENDMENT REMEDY

1. REMEDY COMPARISON

The selected remedy described in the 1989 ROD was developed by combining different source control alternatives and a migration management alternative to provide a comprehensive approach for Site remediation. It involved extracting and treating groundwater in the vicinity of the northeast corner of the NHBB facility where VOC concentrations are highest (the GZH-4 Source Area) and extracting and treating groundwater contaminated at lower levels that had migrated beyond the NHBB property boundary (the dilute plume). Both the GZH-4 Source Area

Record of Decision Amendment

Part 2 – The Decision Summary

and dilute plume extraction/discharge systems had a design goal of providing hydraulic control to protect the South Well from contamination. The remedy also included the installation and operation of an in-situ soil vacuum extraction system to reduce elevated VOC concentrations in soils located around and under the northeast corner of the NHBB facility and the excavation and offsite disposal of contaminated sediments from Site wetlands followed by wetlands restoration.

In response to the 1997 ESD and TI Evaluation, the 1989 ROD remedy was revised to hydraulically contain from the rest of the aquifer (not extract and treat) the NHBB plume located within the TI Waiver Area and to discontinue operation of the VES.

The detection of VOCs at concentrations above groundwater cleanup levels in monitoring wells located near the South Well during the 2003-2005 long-term pumping test demonstrated the inability of the existing hydraulic containment system to maintain a barrier between the NHBB plume area and the rest of the aquifer. This failure of the original selected remedy (as amended by the 1993 and 1997 ESDs) to meet the RAOs specified in the 1989 ROD, necessitated a fundamental change to the source control and migration management components of the original selected remedy. Significant additional investigations have occurred and a FFS was prepared in 2009 that identified and evaluated new remedial alternatives for source mass reduction and dissolved phase contaminant plume management for the Site. **Table 2** compares the components of the original 1989 ROD remedy to the components included in CTS 4, the amended remedy selected in this ROD Amendment.

The remedy selected in this ROD Amendment does not change the long-term groundwater monitoring, institutional controls, or five year reviews required in the 1989 ROD. Nor does this ROD Amendment change the original cleanup approach, as modified by the 1993 ESD, to allow natural attenuation of the dilute plume, provided there is sufficient reduction in VOC loading to groundwater from upgradient source areas and capture and treatment of any remaining contaminant plume at the TI Waiver boundary. The TI Waiver that accompanied the 1997 ESD is not affected by this ROD Amendment, nor is the size or location of the TI Waiver Area affected.

**Record of Decision Amendment
Part 2 – The Decision Summary**

**Table 2
Comparison of Remedy Components**

1989 ROD	2010 ROD Amendment
Extraction of contaminated overburden groundwater from the GZH-4 Source Area and the dilute plume and treatment to groundwater cleanup levels. The groundwater extraction system for the source area was designed to provide a hydrologic barrier between groundwater in the source area and the rest of the aquifer; the groundwater extraction system for the dilute plume was designed to provide a hydrologic barrier between groundwater in the dilute plume and the South Municipal Water Supply Well.	Extraction and treatment is not a component of this ROD Amendment.
In-situ vacuum extraction of VOC contaminated soils located above the water table in the vicinity of the northeast corner of the NHBB facility and the area near monitoring well GZ-105 to soil cleanup levels.	In-situ vacuum extraction system operated from 1994 to 1997. It is not a component of this ROD Amendment.
Excavation and offsite disposal of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), or metals contaminated sediments from Site wetlands followed by wetlands restoration.	Excavation and offsite disposal of sediments and restoration of Site wetlands were completed in 1994. These media are not a component of this ROD Amendment.
In-situ thermal treatment is not a component of the 1989 ROD.	In-situ thermal treatment of contaminated overburden soil and groundwater within source areas identified on the NHBB property and the VP-17 area. Heat will be applied in-place to mobilize overburden contaminants for collection and treatment, to reduce contaminant mass and diminish contaminant loading into groundwater.
In-situ bioremediation is not a component of the 1989 ROD.	In-situ bioremediation of overburden source areas for further contaminant mass reduction after in-situ thermal treatment (polishing step) and decreased contaminant loading into groundwater.

**Record of Decision Amendment
Part 2 – The Decision Summary**

1989 ROD	2010 ROD Amendment
Permeable reactive barrier treatment is not a component of the 1989 ROD.	In-situ capture and treatment of contaminated overburden groundwater leaving the NHBB property to groundwater cleanup levels via the construction and maintenance of a permeable reactive barrier.
Long-term monitoring of groundwater and treated effluent to evaluate remedial action performance.	Long-term groundwater monitoring to evaluate remedial action performance. Performance monitoring will include future pumping tests on the South Municipal Well.
Implementation of institutional controls, including restrictions on the use of the South Municipal Water Supply Well, to ensure contaminated groundwater will not be used as a drinking water source until cleanup levels are achieved.	Monitor and maintain existing institutional controls that regulate the pumping or use of groundwater within the established groundwater protection overlay district that includes the Site.
Implementation of five-year reviews to assess the protectiveness of the remedy until cleanup goals are met.	Implementation of five-year reviews to assess the protectiveness of the remedy until cleanup goals are met.

2. REMEDIAL ACTION OBJECTIVES

(a) 1989 ROD RAOs

The 1989 ROD established RAOs for protection of human health and the environment as they relate to soil, sediments, and groundwater at the South Municipal Well Site as follows:

1. Specific soil target cleanup levels will be met in the remedial action in order to reduce contaminant levels to eliminate the potential migration of contaminants from the soils into the groundwater at levels exceeding groundwater cleanup target levels;
2. Specific sediment target cleanup levels will be met in the remedial action in order to eliminate, to the maximum extent practicable, the potential exposure of humans or environmental receptors to Site related contaminants;
3. Restore the contaminated portion of the aquifer, including all the dilute plume area, to drinking water quality [USEPA National Primary Drinking Water Standards Maximum Contaminant Levels (MCLs)] in as short a time frame as practicable;

Record of Decision Amendment
Part 2 – The Decision Summary

4. Prevent migration of the contaminated groundwater into uncontaminated portions of the aquifer;
5. Implement a groundwater extraction system which creates a barrier between highly contaminated groundwater in the NHBB area and the dilute plume, so use of the portion of the aquifer affected by the dilute plume could occur independent of the restoration of the NHBB area; and
6. Implement a groundwater extraction system which creates a barrier between the dilute plume area and the South Municipal well, to permit restricted use of the South Well in the event of water supply emergencies prior to full attainment of groundwater cleanup target levels in the dilute plume.

Target groundwater cleanup levels were also established in order to remediate the groundwater so the entire aquifer may once again be a source of drinking water for the Town of Peterborough.

(b) 2010 ROD Amendment RAOs

The RAOs for this ROD Amendment are designed to provide adequate protection to human health from direct contact, ingestion, or inhalation of hazardous constituents from the groundwater and soil. The 2010 ROD Amendment RAOs are:

1. Restore the entire aquifer outside of the TI Waiver Area to drinking water quality (MCLs) in as short a time as practicable in order to return the South Municipal Water Supply Well to the Town of Peterborough as a drinking water source without the implementation of wellhead treatment;
2. Prevent the migration of contamination from within the TI Waiver Area into other portions of the aquifer, the dilute plume area, and overlying structures to the extent practicable;
3. Reduce contaminant concentrations within the TI Waiver Area;
4. Reduce soil contaminant concentrations outside the TI Waiver Area to NHDES Method 1 Category S-1 Soil Standards; and
5. Prevent exposure to the contaminated soil and groundwater both within the TI Waiver Area and outside the TI Waiver Area.

Target soil and groundwater cleanup levels for many of the primary COCs were also developed and are presented in **Table 3** herein. Soil and groundwater cleanup levels are all chemical specific ARARs. Detailed chemical specific, location specific, and action specific ARAR tables are contained in **Appendix C**. All chemical specific ARARs are remediation goals for this ROD Amendment. The point of compliance for determining whether ARARs have been achieved is

Record of Decision Amendment
Part 2 – The Decision Summary

anywhere along or outside the TI Waiver Area boundary, except for vapor intrusion ARARs, which have a point of compliance throughout the entire Site.

Table 3
Target Soil and Groundwater Cleanup Levels
Outside the TI Waiver Area

Chemical of Concern	Soil Cleanup Level¹ (mg/kg)	Basis	Groundwater Cleanup Level¹ (ug/L)	Basis
PCE	2	NH S-1	5	MCL
TCE	0.8	NH S-1	5	MCL
1,1,1-TCA	78	NH S-1	200	MCL
cis 1,2-DCE	2	NH S-1	70	MCL
trans 1,2-DCE	9	NH S-1	100	MCL
1,1-DCE	2	NH S-1	7	MCL
1,1-DCA	3	NH S-1	81	NH GW-1
vinyl chloride	1	NH S-1	2	MCL
1,4-dioxane	5	NH S-1	3	NH GW-1
Notes ¹ Soil and Groundwater Cleanup Levels are all chemical specific ARARs NH S-1: New Hampshire Method 1 Category S-1 Soil Standard MCL: Federal Safe Drinking Water Act Maximum Contaminant Level NH GW-1: New Hampshire Method 1 GW-1 Ambient Groundwater Quality Standard				

3. CHANGES IN EXPECTED OUTCOMES

A fundamental expected outcome of this ROD Amendment selected remedy is that the Site will no longer present an unacceptable risk from exposure to Site soils or inhalation of volatile chemicals that have migrated from the subsurface into overlying buildings; and the aquifer will be suitable for unrestricted use in all areas located outside the TI Waiver Area.

To achieve this outcome, aggressive source treatment such as in-situ thermal treatment is necessary to provide destruction of source mass, including dense non-aqueous phase liquids (DNAPLs), which are considered principal threat wastes, and reduction of contaminant flux to groundwater. Coupling thermal treatment with the less aggressive in-situ bioremediation treatment and a permeable reactive barrier provides additional treatment of VOCs present within and outside of the TI Waiver Area. The groundwater modeling results presented in Section 3.4 of the 2009 *Focused Feasibility Study* point out the need for aggressive source reduction to achieve the 2010 RAOs outside the TI Waiver Area.

The VOCs present at concentrations above ARARs in the dilute plume are expected to naturally attenuate, provided there is sufficient reduction in VOC loading to groundwater from upgradient

Record of Decision Amendment Part 2 – The Decision Summary

source areas and capture and treatment of any remaining contaminant plume via a permeable reactive barrier at the TI Waiver boundary.

H. SUPPORT AGENCY COMMENTS

Agencies of the State of New Hampshire have been involved with the Site since shortly after the discovery of VOCs in the South Municipal Well in 1982. The New Hampshire Department of Environmental Services is the lead support agency at the Site. NHDES has been actively involved with the data collection and evaluation leading up to the FFS and supports this ROD Amendment. A Letter of Concurrence from the State is included in **Appendix B**.

I. STATUTORY DETERMINATIONS

CERCLA Section 121, 42 U.S.C. § 9621 and the NCP, 40 C.F.R. § 300.430 require that remedies selected for Superfund sites are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how this ROD Amendment meets these legal requirements. The remedy as amended is consistent with CERCLA and, to the extent practicable, the NCP. This ROD Amendment is protective of human health and the environment, attains ARARs (or invokes an appropriate waiver) and is cost effective.

1. THE AMENDED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT

This ROD Amendment will adequately protect human health and the environment by eliminating, reducing, or controlling exposures to human and environmental receptors through in-situ thermal treatment of contaminated soil, groundwater, and DNAPL in identified source areas, in-situ bioremediation of residual soil and groundwater contamination and residual DNAPL after the in-situ thermal treatment program, in-situ capture and treatment of contaminated groundwater via a PRB, institutional controls (ICs), and long-term monitoring. VOC mass reduction will also diminish the VOC flux into groundwater and reduce the sources for vapor intrusion into Site structures. Existing ICs established by the Town of Peterborough regulate the pumping or use of groundwater within a groundwater protection overlay district that includes the Site. The ICs would continue to be implemented to: 1) prevent disturbance of the permeable reactive barrier, and 2) maintain the groundwater protection overlay district that restricts groundwater use on and near the Site. The point of compliance for determining whether the soil or groundwater target cleanup levels have been achieved will be anywhere along or

Record of Decision Amendment

Part 2 – The Decision Summary

outside of the TI Waiver Area boundary, except for vapor intrusion ARARs, which have a point of compliance throughout the entire Site.

This ROD Amendment will reduce potential human health risk levels such that they do not exceed EPA's acceptable risk range of 10^{-4} to 10^{-6} for incremental carcinogenic risk. The remedy will ensure that the non-carcinogenic hazard is below a level of concern because the calculated hazard index (HI) will not exceed 1.

Implementation of this ROD Amendment will not pose any unacceptable short-term risks or cause any cross-media impacts.

2. THE AMENDED REMEDY COMPLIES WITH ARARS

This ROD Amendment will comply with all applicable or relevant and appropriate federal and state requirements that apply to it. ARARs were identified during the development of the FFS and were reviewed as part of the Proposed Plan and ROD Amendment process, as well as identified in the 1989 ROD. Through this ROD Amendment, ARARs that address the contaminated soils outside the TI Waiver Area, specifically the VP-17 Source Area, are also to be addressed. The selected remedy, Comprehensive Treatment Scenario 4 (CTS 4), is expected to comply with ARARs and is protective of human health and the environment.

Significant ARARs identified in the 2009 FFS include the groundwater cleanup levels that are required to be achieved anywhere along or outside the TI Waiver Area boundary. The federal MCLs and non-zero MCLGs govern the quality of drinking water provided by public water supply and are relevant and appropriate requirements for groundwater remediation at the Site. Because the FFS focused on groundwater, there was limited discussion of ARARs for soil contamination located outside the TI Waiver Area. The selected remedy will comply with those ARARs for soil contamination found outside the TI Waiver Area.

Contamination in the VP-17 Source Area will be fully characterized as part of the selected remedy. In particular, there will be a complete VP-17 Source Area delineation and determination of release mechanism(s), including laboratory analysis of potential contaminants of concern in soil samples collected from potentially contaminated areas located outside the TI Waiver Area.

A significant change from the Proposed Plan is the addition of 1,4-dioxane as a primary contaminant of concern at the Site. A review of 1,4-dioxane in Site groundwater reveals the chemical is present above the NHDES Ambient Groundwater Quality Standard (AGQS) of 3 ug/L (no federal MCL exists for 1,4-dioxane) in samples collected from locations within and outside the TI Waiver Area. The occurrence of 1,4-dioxane in groundwater at the Site since 2003 is presented in the July 2, 2009 correspondence to EPA from Hull & Associates, Inc. As part of this ROD Amendment, EPA is including 1,4-dioxane as a contaminant of concern and is establishing a soil cleanup level of 5 mg/kg and a groundwater cleanup level of 3 ug/L for the

Record of Decision Amendment

Part 2 – The Decision Summary

Site based on the NHDES ARAR. These cleanup levels specifically apply to all areas of the Site, excluding the TI Waiver Area.

Specific information about the Site ARARs may be found in the ARAR tables included in **Appendix C** of this ROD Amendment. Site ARARs are discussed in Section 2.2 of the FFS.

3. THE AMENDED REMEDY IS COST-EFFECTIVE

In EPA's judgment, the selected remedy (CTS 4), as modified, is cost effective because the remedy's costs are proportional to its overall effectiveness (see 40 CFR 300.430(f)(1)(ii)(D)). This determination was made by evaluating the overall effectiveness of the selected remedy that satisfied the threshold criteria (i.e., that are protective of human health and the environment and comply with all federal and any more stringent state ARARs, or as appropriate, waive ARARs).

EPA has determined that the selected remedy in this ROD Amendment meets both threshold criteria and is reasonable given the relationship between the overall effectiveness afforded by the other alternatives and costs. While some other alternatives evaluated in the FFS cost less, EPA believes the difference in cost is not so significant as to outweigh the long-term protectiveness provided by the selected remedy. The selected remedy aggressively treats the source of the contamination through in-situ thermal treatment of contaminated soil, groundwater, and DNAPL in identified source areas, in-situ bioremediation of residual soil and groundwater contamination and residual DNAPL after the in-situ thermal treatment program, and in-situ capture and treatment of contaminated groundwater via a PRB.

4. THE AMENDED REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

This ROD Amendment provides the most effective alternative to achieve a key remedial action objective of the 1989 ROD, namely the remediation of groundwater and soil to target levels that would allow for the reactivation of the South Municipal Well and reuse of the aquifer as a drinking water source by the Town of Peterborough without the implementation of wellhead treatment. Once the Agency identified those alternatives that attain or, as appropriate, waive ARARs, and that are protective of human health and the environment, EPA identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility or volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost. The balancing test emphasized the long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment, and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. EPA finds that the Amended Remedy (CTS 4, as modified) provides the best balance of trade-offs between the alternatives. EPA finds that modified CTS 4

Record of Decision Amendment

Part 2 – The Decision Summary

is the most effective alternative to address the elevated VOCs remaining within the Site source areas and to reduce the risks presented by the Site source areas and groundwater.

The selected remedy provides long-term effectiveness and permanence while using treatment to reduce the toxicity, mobility, and volume of the contaminant mass material. In-situ thermal treatment, in-situ bioremediation, and a PRB are principal elements of the selected remedy in achieving cleanup levels. The State of New Hampshire and the community in Peterborough are supportive of the selected remedy. The potential to cost effectively achieve cleanup goals supports the selection of CTS 4 (as modified).

5. THE AMENDED REMEDY SATISFIES THE PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The principal elements of the selected remedy are the in-situ thermal treatment and in-situ bioremediation of soil, groundwater and DNAPLs, along with a PRB. These elements address the principal threats at the Site – DNAPL and the remaining soil contamination – and the risk to local water supplies presented by chemicals that exceed MCLs. The selected remedy satisfies the statutory preference for treatment as a principal element by reducing contaminant mass in the overburden soil and groundwater through in-situ thermal treatment and in-situ bioremediation coupled with in-situ groundwater treatment via a PRB. In addition, VOC mass reduction will diminish the VOC flux into groundwater and reduce the sources of vapor intrusion into Site structures.

In-situ thermal treatment of source areas with the highest VOC concentrations in soil and groundwater and DNAPL will reduce contaminant mass, diminish VOC loading into groundwater, and reduce probable contaminant source areas from contributing to vapor intrusion issues. In-situ bioremediation will be applied to enhance contaminant biodegradation at the Site and the physical and chemical break down of contaminants in place. The PRB will provide passive treatment of contaminated groundwater leaving the NHBB property at the TI Waiver Area boundary.

6. FIVE-YEAR REVIEWS

Because contaminants will remain onsite above levels that allow for unlimited use and unrestricted exposure, EPA will continue to review the Site every five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

J. PUBLIC PARTICIPATION

This ROD Amendment meets the criteria for community involvement specified in CERCLA Section 117 and in Sections 300.435(c)(2)(ii)(A) through (H) of the NCP.

Record of Decision Amendment

Part 2 – The Decision Summary

Throughout the cleanup of the Site, community concern and involvement has been moderate. The local Select Board have actively sought EPA and NHDES's involvement at the Site to address the affects of contamination at the South Municipal Well since in 1982. EPA has kept the community and other interested parties informed of Site activities through informational meetings, fact sheets, press releases, and public meetings. Information about the Site is posted on EPA's website at www.epa.gov/ne/southmuni. EPA has met regularly with the community and Select Board to keep them informed and to seek their input regarding Site activities. The community has also benefited from the efforts of New Hampshire Ball Bearings and their contractors to investigate and remediate the Site.

A chronology of public outreach efforts related to this ROD Amendment includes:

- December 1, 2009 update to the Town of Peterborough Select Board by NHBB regarding the recently completed FFS and the EPA on the ROD Amendment process;
- May 18, 2010 Public Information Meeting at Peterborough Town Hall to provide copies of and to discuss the proposed remedy change presented in the Proposed Plan; and
- June 16, 2010 Public Hearing to receive verbal comments on the Proposed Plan.

K. DOCUMENTATION OF SIGNIFICANT CHANGES FROM THE PROPOSED PLAN

On May 18, 2010, EPA presented a proposed plan that described the application of a combination of remedial alternatives on and adjacent to the NHBB property to address existing soil, groundwater, and residual DNAPL contamination. EPA reviewed all written and verbal comments submitted during the public comment period and none of the comments opposed the Proposed Plan changes to the 1989 ROD. A responsiveness summary that addresses all the comments received during the public comment period is presented in Part 3 of this ROD Amendment.

One comment did point out a clarification to a typographical error in the 2009 *Focused Feasibility Study* that has resulted in a significant change from the proposed plan. More specifically, the FFS incorrectly described Alternative 15A as treating the >1,000 ug/L VOC contaminant plume in the VP-17 Source Area. Correctly stated, Alternative 15 will treat the area with >1,000 ug/L VOCs and Alternative 15A will treat the concentrated VP-17 Source Area with >10,000 ug/L VOCs. Because VOCs have been detected at concentrations greater than ARARs within the VP-17 Source Area, an area partially located outside the TI Waiver Area, EPA has selected Alternative 15 and the >1,000 ug/L treatment zone it applies to after determining it is more appropriate than Alternative 15A to remove contaminant mass and remediate all contaminated media at locations outside the TI Waiver Area to cleanup levels.

A second significant change from the proposed plan relates to the addition of 1,4-dioxane as a primary contaminant of concern at the Site. A review of 1,4-dioxane in Site groundwater reveals that the chemical is present above the NHDES Ambient Groundwater Quality Standard (AGQS)

Record of Decision Amendment
Part 2 – The Decision Summary

of 3 ug/L (no federal MCL exists) in samples collected from locations within and outside the TI Waiver Area. The occurrence of 1,4-dioxane in groundwater at the Site since 2003 is presented in the July 2, 2009 correspondence to EPA from Hull & Associates, Inc.

As part of this ROD Amendment, EPA is including 1,4-dioxane as a contaminant of concern and is establishing a soil cleanup level of 5 mg/kg and a groundwater cleanup level of 3 ug/l for the Site based on the NHDES ARAR. These cleanup levels specifically apply to all areas of the Site, excluding the TI Waiver Area.

Record of Decision Amendment

Part 3 – The Responsiveness Summary

A. PREFACE

The purpose of this Responsiveness Summary is to document EPA's responses to questions, comments, and concerns raised during the public comment period on the May 2010 Proposed Plan for the South Municipal Water Supply Well Superfund Site (the Site). A Responsiveness Summary is required by CERCLA §117 and the NCP §§300.430(f)(3)(i)(F) and 300.430(f)(5)(iii)(B).

The EPA held a 31 day comment period from May 19 to June 18, 2010 on the May 2010 Proposed Plan. Verbal comments were received from two local residents at the Public Hearing held on June 16, 2010 at the Peterborough Town Hall in Peterborough, New Hampshire. **Attachment A** to this Responsiveness Summary contains a copy of the transcript from the public hearing.

Written comments were also received from NHBB and Hull and Associates, Inc., as well as from a local resident. No other entities submitted comments to EPA either in writing or at the public hearing. All of the original comments submitted to EPA are included in the Administrative Record.

EPA considered all of the comments provided during the 31 day comment period and summarized in this document before selecting a final remedial action to address the contamination at the Site. None of the comments received by EPA were in opposition to the proposed remedy change. The State of New Hampshire is supportive of the proposed remedy change and this ROD Amendment for the Site.

B. SUMMARY OF COMMENTS RECEIVED AND EPA RESPONSES

The citizen comments and EPA responses are presented below, followed by stakeholder comments and EPA responses.

Part I – Citizen Comments

1. One commenter stated they support the Proposed Plan and expressed satisfaction with EPA's involvement at the Site. An email received from the same commenter also expressed satisfaction at having been informed of the proposed remedy change and requested continued efforts to keep the public informed, at least annually, throughout the duration of the project.

EPA Response:

The Agency appreciates the positive feedback on the community engagement and management of the remedial process at the Site. It is committed to keeping the community informed and to seek their input regarding Site activities as the selected

Record of Decision Amendment

Part 3 – The Responsiveness Summary

remedy is implemented, through a combination of formal and informal efforts. Past efforts to keep the community and other interested parties informed of Site activities have included informational meetings, fact sheets, press releases, and public meetings. Information about the Site is periodically updated and posted on EPA's website at www.epa.gov/ne/southmuni and EPA intends to meet regularly with the community and Select Board as cleanup activities progress. If any person or party has immediate questions about the Site or activities related to the Site, they are encouraged to contact the EPA Remedial Project Manager or the New Hampshire Department of Environmental Services Project Manager identified at the beginning of Part 2 of this ROD Amendment.

2. One commenter expressed concern with not seeing any provisions for the use of an air stripper to control impacts to air quality in the area of the Site, either now or during the implementation of the selected remedy.

EPA Response:

The 1989 ROD required control of air emissions from the air stripping tower that was used to treat groundwater extracted from the Site. This requirement was included to comply with the EPA's Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-28 to limit air emissions in certain areas with ozone concerns and to comply with CERCLA, which favors treatment that permanently and significantly reduces the volume, toxicity, or mobility of contaminants. However, conditions affecting these requirements have changed considerably since the 1989 ROD.

First, there have been few violations of the ozone standards in the Peterborough area since 1988. Second, new information about the reactivity of certain VOCs became available in the early 1990s that indicated the emission rates from the air stripping tower fell well below the limits specified in the OSWER directive. These factors lessened the need for controls to reduce emissions from the air stripping tower based on ozone concerns. Subsequently, EPA issued a 1993 Explanation of Significant Differences (ESD) document that removed the requirement for air emission controls on the groundwater extraction and treatment system.

Part II – Stakeholder Comments

1. The Responsible Party supports use of electrical resistance heating (ERH) as opposed to other thermal treatments, such as in-situ thermal destruction (ISTD) and steam enhanced extraction (SEE).

EPA Response:

EPA also agrees that ERH is the most appropriate in-situ thermal treatment technology to use within the highest concentration and potential DNAPL source areas identified on the Site. Additional pre-design investigations will be conducted that may provide new

Record of Decision Amendment

Part 3 – The Responsiveness Summary

information which may alter the ultimate thermal treatment technology to be used at the Site.

2. The Responsible Party and their consultant discussed the description of the in-situ thermal treatment area in the VP-17 Source Area and noted a discrepancy between what's presented in the Focused Feasibility Study (FFS) and the Proposed Plan. It was also noted that the costs to implement in-situ bioremediation in the VP-17 area were not reflected in the FFS and the Proposed Plan.

EPA Response:

EPA recognizes this inconsistency in the 2009 *Focused Feasibility Study* and as noted in Section K of the ROD Amendment Decision Summary, the typographical error contained in the FFS resulted in a significant change from what was presented in the Proposed Plan.

More specifically, the FFS incorrectly described Alternative 15A as treating the >1,000 ug/L VOC contaminant plume in the VP-17 Source Area. Correctly stated, Alternative 15 will treat the area with >1,000 ug/L VOCs and Alternative 15A will treat the concentrated VP-17 Source Area with >10,000 ug/L VOCs. Because VOCs have been detected at concentrations greater than ARARs within the VP-17 Source Area, an area partially located outside the TI Waiver Area, EPA has selected Alternative 15 and the >1,000 ug/L treatment zone it applies to. EPA determined that Alternative 15 would remove greater contaminant mass than Alternative 15A, and remediate all contaminated media at locations outside the TI Waiver Area to cleanup levels.

The comment related to the costs for in-situ bioremediation in the VP-17 area is no longer appropriate as EPA has selected Alternative 15 (in-situ thermal treatment) to treat this area and comply with all applicable or relevant and appropriate (ARAR) requirements since this source area is located adjacent to and outside the TI Waiver Area. While in-situ bioremediation may be extended outside the NHBB property during its implementation on the NHBB property (Alternative 19D), extension of this alternative to the VP-17 Source Area may be needed to meet ARARs.

3. The possibility of analyzing various backfill options to create the reactive barrier was presented in the Proposed Plan. A sand/iron mixture was specified in the FFS, without consideration of other possible treatments.

EPA Response:

As noted in Section D of the ROD Amendment Decision Summary, the remedial alternatives presented as part of each CTS in the FFS were specified based on the current understanding of the nature and extent of contamination at the Site. This ROD Amendment utilizes this specific information for cost estimating and conceptual design purposes only. It does not prescribe the specific type, location, areal length (for PRB), or

Record of Decision Amendment

Part 3 – The Responsiveness Summary

duration of the in-situ thermal, in-situ bioremediation, or PRB process options that will be implemented. Each specific remedial process option will be determined using pre-design findings. This provides the greatest flexibility using new information and data as it becomes available to optimize the design of the selected remedy in order to achieve all of the 2010 ROD Amendment RAOs in the shortest time practicable.

4. The Responsible Party's consultant expressed concern regarding the potential technical obstacles to restoring all groundwater to drinking standards and the ability to address the entire affected area. The possibility was raised that the proposed remedy could leave a remnant dissolved plume that migrates beyond the boundary of the TI Waiver Area and it was pointed out that because the boundary for the TI Waiver Area is simply an existing property line and not a geophysical boundary, difficulties could arise. In addition, concerns were raised regarding the ability to reach ARARs and all RAOs outside the TI Waiver Area and the appropriateness of applying the NHDES S-1 instead of S-2 Soil Standards to areas beyond the TI Waiver Area boundary.

EPA Response:

EPA shares the technical concerns of the RP with respect to restoration of the entire aquifer beyond the TI Waiver Area due to the presence of source mass in and near bedrock at the Site. This concern notwithstanding, restoration and return of the South Municipal Water Supply Well without wellhead treatment has and will continue to be a requirement for cleanup of the Site and aggressive remediation of source areas, as provided in this ROD Amendment, provide the strongest paths to achieving all RAOs.

As noted in Section G of the ROD Amendment Decision Summary, the Remedial Action Objectives (RAOs) for this ROD Amendment have been modified since issuance of the original 1989 ROD to be more specific with respect to this comment. In particular, the 2010 RAOs include, at a minimum: (1) restore the entire aquifer outside of the TI Waiver Area to drinking water quality (MCLs) in as short a time as practicable in order to return the South Municipal Water Supply Well to the Town of Peterborough as a drinking water source without the implementation of wellhead treatment; (2) prevent the migration of contamination from within the TI Waiver Area into other portions of the aquifer, the dilute plume area, and overlying structures to the extent practicable; (3) reduce contaminant concentrations within the TI Waiver Area; (4) reduce soil contaminant concentrations outside the TI Waiver Area to NHDES Method 1 Category S-1 Soil Standards; and (5) prevent exposure to the contaminated soil and groundwater both within the TI Waiver Area and outside the TI Waiver Area.

With respect to the S-1 standards, the EPA finds them applicable due to the diverse uses permitted by the Town of Peterborough within a Business/Industrial District, including: industrial, warehousing, storage, distribution, lodging, conference, assisted living, recreational, public, and if associated with a permitted principal business use, residential.

ATTACHMENT A

PUBLIC HEARING TRANSCRIPT

<p style="text-align: center;">TOWN OF PETERBOROUGH PUBLIC HEARING</p> <p style="text-align: center;">South Municipal Water Supply Well Superfund Site</p> <p style="text-align: center;">One Grove Street Peterborough, NH 03458 7:00 p.m. Wednesday, June 16, 2010</p> <p>Hearing Officer: Mr. Michael Jasinski, Environmental Protection Agency</p>	<p style="text-align: right;">2</p> <p>1 <u>INDEX</u></p> <p>2 <u>OPENING STATEMENT:</u></p> <p>3</p> <p>4 <u>Page</u></p> <p>5 By Mr. Jasinski 3</p> <p>6</p> <p>7</p> <p>8 <u>AUDIENCE</u></p> <p>9</p> <p>10 Mr. Weir 5</p> <p>11 Mr. Schongar 6</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p>
<p style="text-align: right;">3</p> <p>1 HEARING OFFICER: Okay. Good evening.</p> <p>2 My name's Mike Jasinski. I'm the Superfund section</p> <p>3 chief at EPA in Boston for New Hampshire, Rhode Island</p> <p>4 Superfund sites that are on the national priorities</p> <p>5 list. I'll be serving, as Kevin said, as hearing</p> <p>6 officer this evening. I'll just go over the purpose</p> <p>7 and the process we'll go through tonight.</p> <p>8 As I said, the purpose of tonight's</p> <p>9 hearing is to accept oral comments, that is your</p> <p>10 comments, this evening for the record that we will</p> <p>11 consider when we develop the final cleanup decision</p> <p>12 for the South Municipal Well Superfund site.</p> <p>13 The proposed plan that Kevin noted a</p> <p>14 minute ago highlights the change in the proposal that</p> <p>15 we at EPA are recommending to the public. During this</p> <p>16 process essentially the change is to the remediation</p> <p>17 that is ongoing at the New Hampshire Ball Bearings</p> <p>18 property and an adjacent parcel of property. It does</p> <p>19 not change any portion of the remedy that's in place</p> <p>20 now beyond 202 and in that general area. It is only a</p> <p>21 change to the remedy that is on the property today,</p> <p>22 which essentially is the pump-and-treat system along</p> <p>23 202.</p>	<p style="text-align: right;">4</p> <p>1 We will not be responding to your formal</p> <p>2 comments tonight. The comments will be recorded by</p> <p>3 the court reporter. We will go to Boston and discuss</p> <p>4 those comments, see whether or not they have any</p> <p>5 impact or change our remedy that we're proposing now.</p> <p>6 Those comments will be recorded and put into what we</p> <p>7 call a responsiveness summary. That responsiveness</p> <p>8 summary will contain all written comments we receive</p> <p>9 in the 30-day comment period as well as oral comments</p> <p>10 we receive tonight. That responsiveness summary will</p> <p>11 be attached to what we call the final record of</p> <p>12 decision, which is our final stamp of approval, if you</p> <p>13 will, on the cleanup that we're proposing tonight and</p> <p>14 any changes that may come out of the public comment</p> <p>15 period process.</p> <p>16 So, those comments will be attached and</p> <p>17 individually responded to in the responsiveness</p> <p>18 summary that will be attached to the final record of</p> <p>19 decision. We expect to have that available sometime</p> <p>20 in the October timeframe. Hopefully earlier.</p> <p>21 After all the oral comments have been</p> <p>22 recorded tonight, I'll close the hearing. If you</p> <p>23 don't feel like making any comments tonight, that's</p>

<p style="text-align: center;">5</p> <p>1 fine with us. We have a comment period that will end 2 on Friday. If you still want to make a comment, you 3 can send an E-mail to Kevin's E-mail address, which is 4 on the proposed plan, or you can write comments and 5 submit them postmarked by Friday evening instead, June 6 18th. That's this coming Friday.</p> <p>7 Any questions on the purpose or the 8 process for the hearing?</p> <p>9 (Pause)</p> <p>10 HEARING OFFICER: Okay. We'll start the 11 formal hearing with anybody that wishes to make any 12 formal comments. If you would just raise your hand, 13 stand up, please state your name, please spell your 14 last name just to make sure we get it right and what 15 your association with the South Municipal Well 16 Superfund Site is.</p> <p>17 So, does anybody wish to make any formal 18 comments tonight? Yes, sir.</p> <p>19 MR. WEIR: My name is David Weir, Old 20 Jaffrey Road, Peterborough, and I'm one of the 21 trustees who represents the Morrison family who are 22 the principal -- who own the land which is the 23 principal area that's been affected by the Superfund</p>	<p style="text-align: center;">6</p> <p>1 Site.</p> <p>2 I just wanted to say that -- to have 3 read into the record that we sent an E-mail to 4 Mr. Heine requesting that we be regularly informed 5 about progress on the remediation, at least on an 6 annual basis, and received a confirmation from him 7 that he had received the E-mail.</p> <p>8 And beyond that, I'd like to 9 congratulate you on the clear presentation and on the 10 cooperativeness and cordiality of the site. Thank 11 you.</p> <p>12 HEARING OFFICER: Thank you, sir. 13 Would anybody else like to make any 14 formal comment this evening for the record?</p> <p>15 MR. WEIR: Do you want a copy of this 16 (indicating)?</p> <p>17 HEARING OFFICER: Thank you. 18 Hearing no other -- no hands. Oh, yes, 19 sir. Yes, sir. Your name?</p> <p>20 MR. SHONGER: I'm Larry Schongar. 21 Resident of Peterborough.</p> <p>22 In reviewing not only the documents you 23 have but in some of the other interim documents, the</p>
<p style="text-align: center;">7</p> <p>1 five-year reviews, these kinds of things, I did not 2 see any provision for absorbing the outflow, if you 3 will, of the air stripper. Has there been -- is that 4 in any of these considerations, or has there been any 5 consideration of it? I've not seen it and I don't 6 know whether that's a consideration for this -- in 7 other words, the impact on the air quality in the 8 area. In some areas they do require carbon absorption 9 on an air stripper. Now, whether that's technically 10 good or technically bad, I'm not here to comment on 11 that but just whether it was done. I know at one time 12 it was quite a concern.</p> <p>13 HEARING OFFICER: So your concern is the 14 air stripper that is operating now?</p> <p>15 MR. SCHONGAR: Yes.</p> <p>16 HEARING OFFICER: And whether or not 17 there's treatment on it --</p> <p>18 MR. SCHONGAR: Yes.</p> <p>19 HEARING OFFICER: -- or the proposal 20 that we're putting forward, whether or not there's any 21 air issues with that?</p> <p>22 MR. SCHONGAR: Both.</p> <p>23 HEARING OFFICER: Just want to clarify.</p>	<p style="text-align: center;">8</p> <p>1 MR. SCHONGAR: The continuing stream. 2 Because if the heat treatment works, hopefully you'll 3 have an increased volume being stripped from the water 4 going through the air stripper.</p> <p>5 HEARING OFFICER: Okay. I understand. 6 Thank you.</p> <p>7 MR. SCHONGAR: Welcome.</p> <p>8 HEARING OFFICER: Thank you very much. 9 Anyone else wish to make a formal 10 comment this evening?</p> <p>11 (Pause)</p> <p>12 HEARING OFFICER: Showing no hands, I 13 will officially close the hearing at 7:12 this 14 evening.</p> <p>15 Again, appreciate you all coming out 16 this evening for about 12 minutes, and I appreciate 17 the comments from the two gentlemen this evening for 18 the record.</p> <p>19 Again, the public comment period will 20 close on Friday. You still have time to E-mail Kevin 21 or even write a letter by Friday. Just make sure it's 22 postmarked and a stamp put on it by Friday so the 23 mailman can pick it up.</p>

1 Thank you very much. Have a good
2 evening.

3 MR. HEINE: Thank you.

4 HEARING OFFICER: Appreciate it.

5 (Hearing concluded at 7:12 p.m.)
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

C E R T I F I C A T E

I, Elaine J. Ritsema, a Certified Court Reporter and Notary Public of the State of New Hampshire, do hereby certify that the foregoing is a true and accurate transcript of my stenographic notes of the Public Hearing taken at the place and on the date hereinbefore set forth.

I further certify that I am neither attorney, nor counsel for, nor related to or employed by any of the parties to the action in which this hearing was taken, and further that I am not a relative or employee of any attorney or counsel employed in this case, nor am I financially interested in this action.

THE FOREGOING CERTIFICATION OF THIS TRANSCRIPT DOES NOT APPLY TO ANY REPRODUCTION OF THE SAME BY ANY MEANS UNLESS UNDER THE DIRECT CONTROL AND/OR DIRECTION OF THE CERTIFYING REPORTER.

Elaine J. Ritsema
Elaine J. Ritsema, CCR, RPR
NH Certified Court Reporter
No. 92 (RSA 331-B)

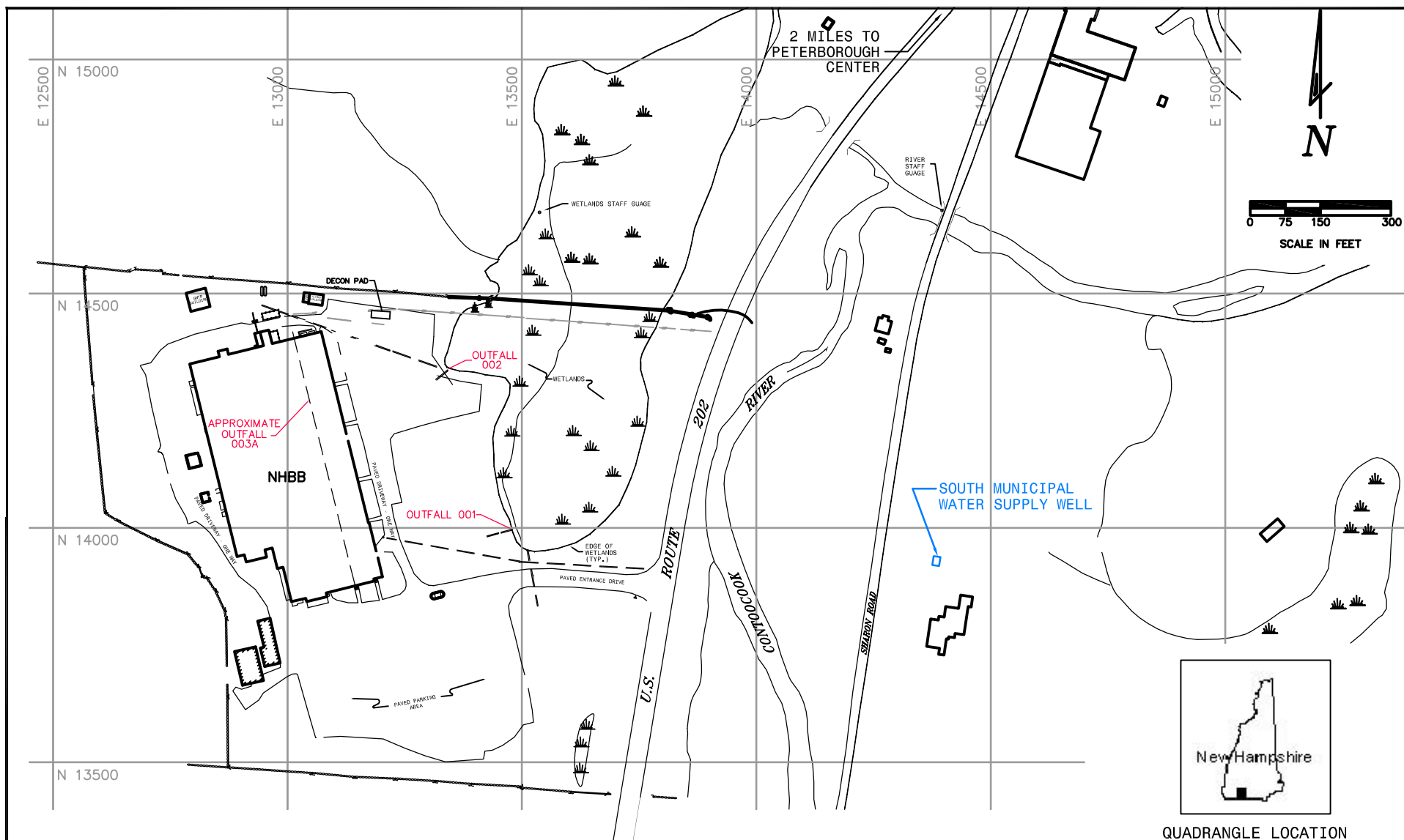


0	Appreciate [1] - 9:4 approval [1] - 4:12 area [3] - 3:20, 5:23, 7:8 areas [1] - 7:8 association [1] - 5:15 attached [3] - 4:11, 4:16, 4:18 attorney [2] - 10:9, 10:13 AUDIENCE [1] - 2:8 available [1] - 4:19	6:6 congratulate [1] - 6:9 consider [1] - 3:11 consideration [2] - 7:5, 7:6 considerations [1] - 7:4 contain [1] - 4:8 continuing [1] - 8:1 CONTROL [1] - 10:16 cooperativeness [1] - 6:10 copy [1] - 6:15 cordiality [1] - 6:10 counsel [2] - 10:10, 10:13 court [1] - 4:3 Court [2] - 10:3, 10:18	final [4] - 3:11, 4:11, 4:12, 4:18 financially [1] - 10:14 fine [1] - 5:1 five [1] - 7:1 five-year [1] - 7:1 foregoing [1] - 10:5 FOREGOING [1] - 10:15 formal [6] - 4:1, 5:11, 5:12, 5:17, 6:14, 8:9 forth [1] - 10:8 forward [1] - 7:20 Friday [6] - 5:2, 5:5, 5:6, 8:20, 8:21, 8:22	interested [1] - 10:14 interim [1] - 6:23 Island [1] - 3:3 issues [1] - 7:21
03458 [1] - 1:13				11
1				J
12 [1] - 8:16 16 [1] - 1:15 18th [1] - 5:6				Jaffrey [1] - 5:20 Jasinski [3] - 1:20, 2:5, 3:2 June [2] - 1:15, 5:5
2				K
2010 [1] - 1:15 202 [2] - 3:20, 3:23	B			Kevin [3] - 3:5, 3:13, 8:20 Kevin's [1] - 5:3 kinds [1] - 7:1
3	bad [1] - 7:10 Ball [1] - 3:17 basis [1] - 6:6 Bearings [1] - 3:17 beyond [2] - 3:20, 6:8 Boston [2] - 3:3, 4:3 BY [1] - 10:15			L
3 [1] - 2:5 30-day [1] - 4:9 331-B [1] - 10:19		D	G	land [1] - 5:22 Larry [1] - 6:20 last [1] - 5:14 least [1] - 6:5 letter [1] - 8:21 list [1] - 3:5
5			general [1] - 3:20 gentlemen [1] - 8:17 Grove [1] - 1:12	M
5 [1] - 2:10	C	date [1] - 10:7 David [1] - 5:19 decision [3] - 3:11, 4:12, 4:19 develop [1] - 3:11 DIRECT [1] - 10:16 DIRECTION [1] - 10:16 discuss [1] - 4:3 documents [2] - 6:22, 6:23 DOES [1] - 10:15 done [1] - 7:11 During [1] - 3:15	H	mail [5] - 5:3, 6:3, 6:7, 8:20 mailman [1] - 8:23 MEANS [1] - 10:15 Michael [1] - 1:20 Mike [1] - 3:2 minute [1] - 3:14 minutes [1] - 8:16 Morrison [1] - 5:21 MR [9] - 5:19, 6:15, 6:20, 7:15, 7:18, 7:22, 8:1, 8:7, 9:3 Municipal [3] - 1:9, 3:12, 5:15
6	carbon [1] - 7:8 case [1] - 10:13 CCR [1] - 10:18 CERTIFICATION [1] - 10:15 Certified [2] - 10:3, 10:18 certify [2] - 10:5, 10:9 CERTIFYING [1] - 10:16 change [5] - 3:14, 3:16, 3:19, 3:21, 4:5 changes [1] - 4:14 chief [1] - 3:3 clarify [1] - 7:23 cleanup [2] - 3:11, 4:13 clear [1] - 6:9 close [3] - 4:22, 8:13, 8:20 coming [2] - 5:6, 8:15 comment [8] - 4:9, 4:14, 5:1, 5:2, 6:14, 7:10, 8:10, 8:19 comments [15] - 3:9, 3:10, 4:2, 4:4, 4:6, 4:8, 4:9, 4:16, 4:21, 4:23, 5:4, 5:12, 5:18, 8:17 concern [2] - 7:12, 7:13 concluded [1] - 9:5 confirmation [1] -		Hampshire [3] - 3:3, 3:17, 10:4 hand [1] - 5:12 hands [2] - 6:18, 8:12 HEARING [13] - 1:5, 3:1, 5:10, 6:12, 6:17, 7:13, 7:16, 7:19, 7:23, 8:5, 8:8, 8:12, 9:4 Hearing [4] - 1:20, 6:18, 9:5, 10:7 hearing [6] - 3:5, 3:9, 4:22, 5:8, 5:11, 8:13 heat [1] - 8:2 heeting [1] - 10:11 Heine [1] - 6:4 HEINE [1] - 9:3 hereby [1] - 10:5 hereinbefore [1] - 10:8 highlights [1] - 3:14 hopefully [1] - 8:2 Hopefully [1] - 4:20	
6 [1] - 2:11		E		I
7		E-mail [5] - 5:3, 6:3, 6:7, 8:20 Elaine [2] - 10:3, 10:18 employed [2] - 10:10, 10:13 employee [1] - 10:12 end [1] - 5:1 Environmental [1] - 1:20 EPA [2] - 3:3, 3:15 essentially [2] - 3:16, 3:22 evening [10] - 3:1, 3:6, 3:10, 5:5, 6:14, 8:10, 8:14, 8:16, 8:17, 9:2 expect [1] - 4:19		impact [2] - 4:5, 7:7 increased [1] - 8:3 INDEX [1] - 2:1 indicating [1] - 6:16 individually [1] - 4:17 informed [1] - 6:4 instead [1] - 5:5
7:00 [1] - 1:14 7:12 [2] - 8:13, 9:5				
9		F		
92 [1] - 10:19		family [1] - 5:21		
A				
absorbing [1] - 7:2 absorption [1] - 7:8 accept [1] - 3:9 accurate [1] - 10:6 action [2] - 10:11, 10:14 address [1] - 5:3 adjacent [1] - 3:18 affected [1] - 5:23 Agency [1] - 1:20 ago [1] - 3:14 air [6] - 7:3, 7:7, 7:9, 7:14, 7:21, 8:4 AND/OR [1] - 10:16 annual [1] - 6:6 ANY [2] - 10:15 APPLY [1] - 10:15 appreciate [2] - 8:15, 8:16				

O	Public [2] - 10:4, 10:7 pump [1] - 3:22 pump-and-treat [1] - 3:22 purpose [3] - 3:6, 3:8, 5:7 put [2] - 4:6, 8:22 putting [1] - 7:20	S	TOWN [1] - 1:4 transcript [1] - 10:6 TRANSCRIPT [1] - 10:15 treat [1] - 3:22 treatment [2] - 7:17, 8:2 true [1] - 10:5 trustees [1] - 5:21 two [1] - 8:17
October [1] - 4:20 OF [4] - 1:4, 10:15, 10:15, 10:16 Officer [1] - 1:20 OFFICER [12] - 3:1, 5:10, 6:12, 6:17, 7:13, 7:16, 7:19, 7:23, 8:5, 8:8, 8:12, 9:4 officer [1] - 3:6 officially [1] - 8:13 Old [1] - 5:19 One [1] - 1:12 one [2] - 5:20, 7:11 ongoing [1] - 3:17 OPENING [1] - 2:2 operating [1] - 7:14 oral [3] - 3:9, 4:9, 4:21 outflow [1] - 7:2 own [1] - 5:22	Q	SAME [1] - 10:15 Schongar [2] - 2:11, 6:20 SCHONGAR [5] - 7:15, 7:18, 7:22, 8:1, 8:7 section [1] - 3:2 see [2] - 4:4, 7:2 send [1] - 5:3 sent [1] - 6:3 serving [1] - 3:5 set [1] - 10:8 SHONGER [1] - 6:20 Showing [1] - 8:12 site [2] - 3:12, 6:10 Site [3] - 1:9, 5:16, 6:1 sites [1] - 3:4 sometime [1] - 4:19 South [3] - 1:9, 3:12, 5:15 spell [1] - 5:13 stamp [2] - 4:12, 8:22 stand [1] - 5:13 start [1] - 5:10 State [1] - 10:4 state [1] - 5:13 STATEMENT [1] - 2:2 stenographic [1] - 10:6 still [2] - 5:2, 8:20 stream [1] - 8:1 Street [1] - 1:12 stripped [1] - 8:3 stripper [4] - 7:3, 7:9, 7:14, 8:4 submit [1] - 5:5 summary [4] - 4:7, 4:8, 4:10, 4:18 Superfund [6] - 1:9, 3:2, 3:4, 3:12, 5:16, 5:23 Supply [1] - 1:9 system [1] - 3:22	U
P	R	T	UNDER [1] - 10:16 UNLESS [1] - 10:16 up [2] - 5:13, 8:23
p.m [2] - 1:14, 9:5 Page [1] - 2:4 parcel [1] - 3:18 parties [1] - 10:11 Pause [2] - 5:9, 8:11 period [4] - 4:9, 4:15, 5:1, 8:19 PETERBOROUGH [1] - 1:4 Peterborough [3] - 1:13, 5:20, 6:21 pick [1] - 8:23 place [2] - 3:19, 10:7 plan [2] - 3:13, 5:4 portion [1] - 3:19 postmarked [2] - 5:5, 8:22 presentation [1] - 6:9 principal [2] - 5:22, 5:23 priorities [1] - 3:4 process [4] - 3:7, 3:16, 4:15, 5:8 progress [1] - 6:5 property [3] - 3:18, 3:21 proposal [2] - 3:14, 7:19 proposed [2] - 3:13, 5:4 proposing [2] - 4:5, 4:13 Protection [1] - 1:20 provision [1] - 7:2 public [3] - 3:15, 4:14, 8:19 PUBLIC [1] - 1:5	quality [1] - 7:7 questions [1] - 5:7 quite [1] - 7:12 raise [1] - 5:12 read [1] - 6:3 receive [2] - 4:8, 4:10 received [2] - 6:6, 6:7 recommending [1] - 3:15 record [6] - 3:10, 4:11, 4:18, 6:3, 6:14, 8:18 recorded [3] - 4:2, 4:6, 4:22 regularly [1] - 6:4 related [1] - 10:10 relative [1] - 10:12 remediation [2] - 3:16, 6:5 remedy [3] - 3:19, 3:21, 4:5 Reporter [2] - 10:3, 10:18 reporter [1] - 4:3 REPORTER [1] - 10:16 represents [1] - 5:21 REPRODUCTION [1] - 10:15 requesting [1] - 6:4 require [1] - 7:8 Resident [1] - 6:21 responded [1] - 4:17 responding [1] - 4:1 responsiveness [4] - 4:7, 4:10, 4:17 reviewing [1] - 6:22 reviews [1] - 7:1 Rhode [1] - 3:3 Ritsema [2] - 10:3, 10:18 Road [1] - 5:20 RPR [1] - 10:18 RSA [1] - 10:19	V	volume [1] - 8:3
W	Y	U	Water [1] - 1:9 water [1] - 8:3 Wednesday [1] - 1:15 WEIR [2] - 5:19, 6:15 Weir [2] - 2:10, 5:19 Welcome [1] - 8:7 wish [2] - 5:17, 8:9 wishes [1] - 5:11 words [1] - 7:7 works [1] - 8:2 write [2] - 5:4, 8:21 written [1] - 4:8
Y	U	S	T
year [1] - 7:1	technically [2] - 7:9, 7:10 THE [4] - 10:15, 10:15, 10:16, 10:16 THIS [1] - 10:15 timeframe [1] - 4:20 TO [1] - 10:15 today [1] - 3:21 tonight [7] - 3:7, 4:2, 4:10, 4:13, 4:22, 4:23, 5:18 tonight's [1] - 3:8	year [1] - 7:1	year [1] - 7:1

APPENDIX A

FIGURES



Hull
& associates, inc.

ENGINEERS | GEOLOGISTS | SCIENTISTS | PLANNERS

4770 DUKE DRIVE
SUITE 300
MASON, OHIO 45040

© 2010 HULL & ASSOCIATES, INC.

PHONE: (513) 459-9677
FAX: (513) 459-9869
www.hullinc.com

SOUTH MUNICIPAL WATER SUPPLY WELL SUPERFUND SITE

FIGURE 1 SITE PLAN

PETERBOROUGH, NEW HAMPSHIRE

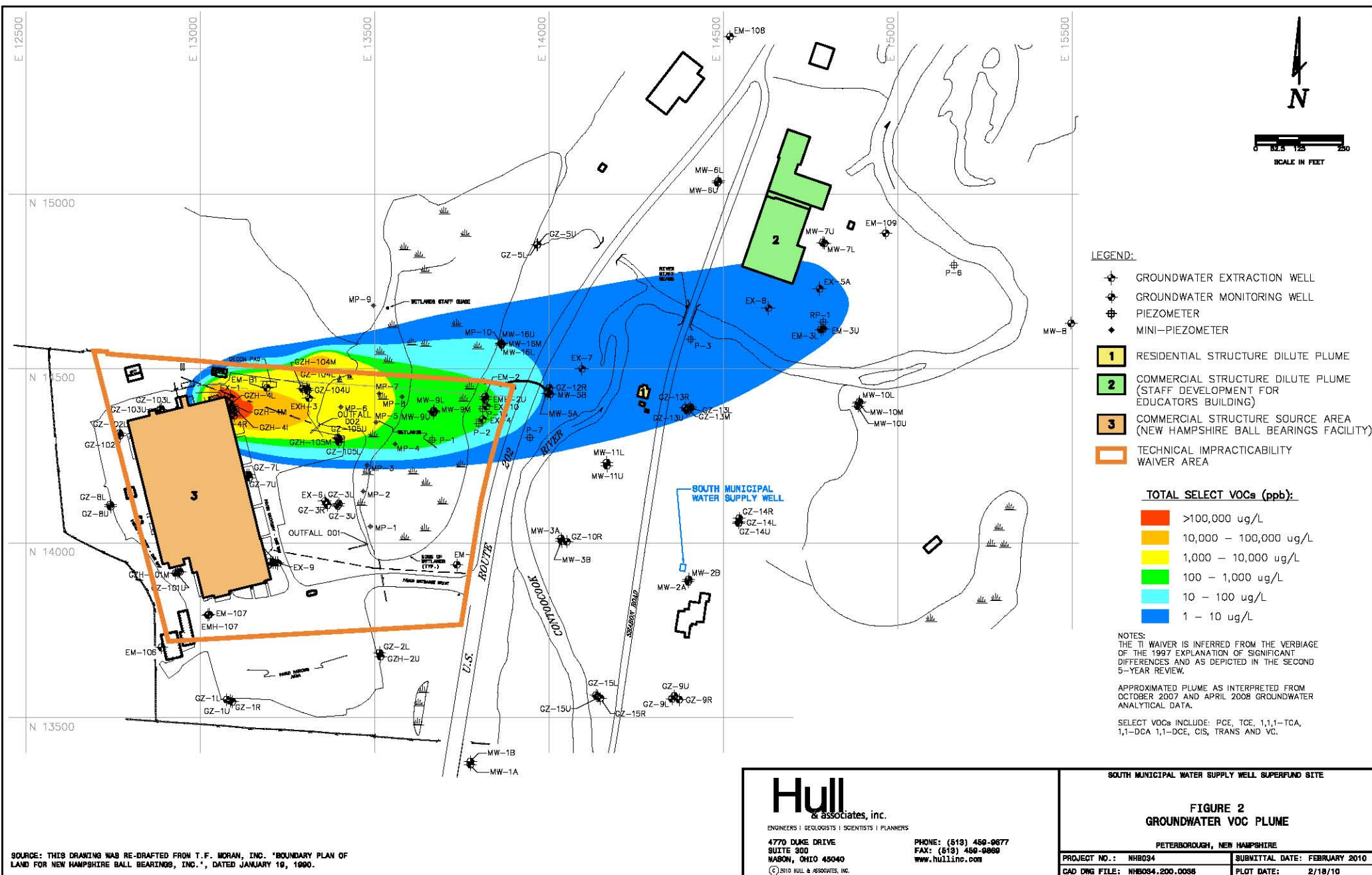
PROJECT NO.: NHB034

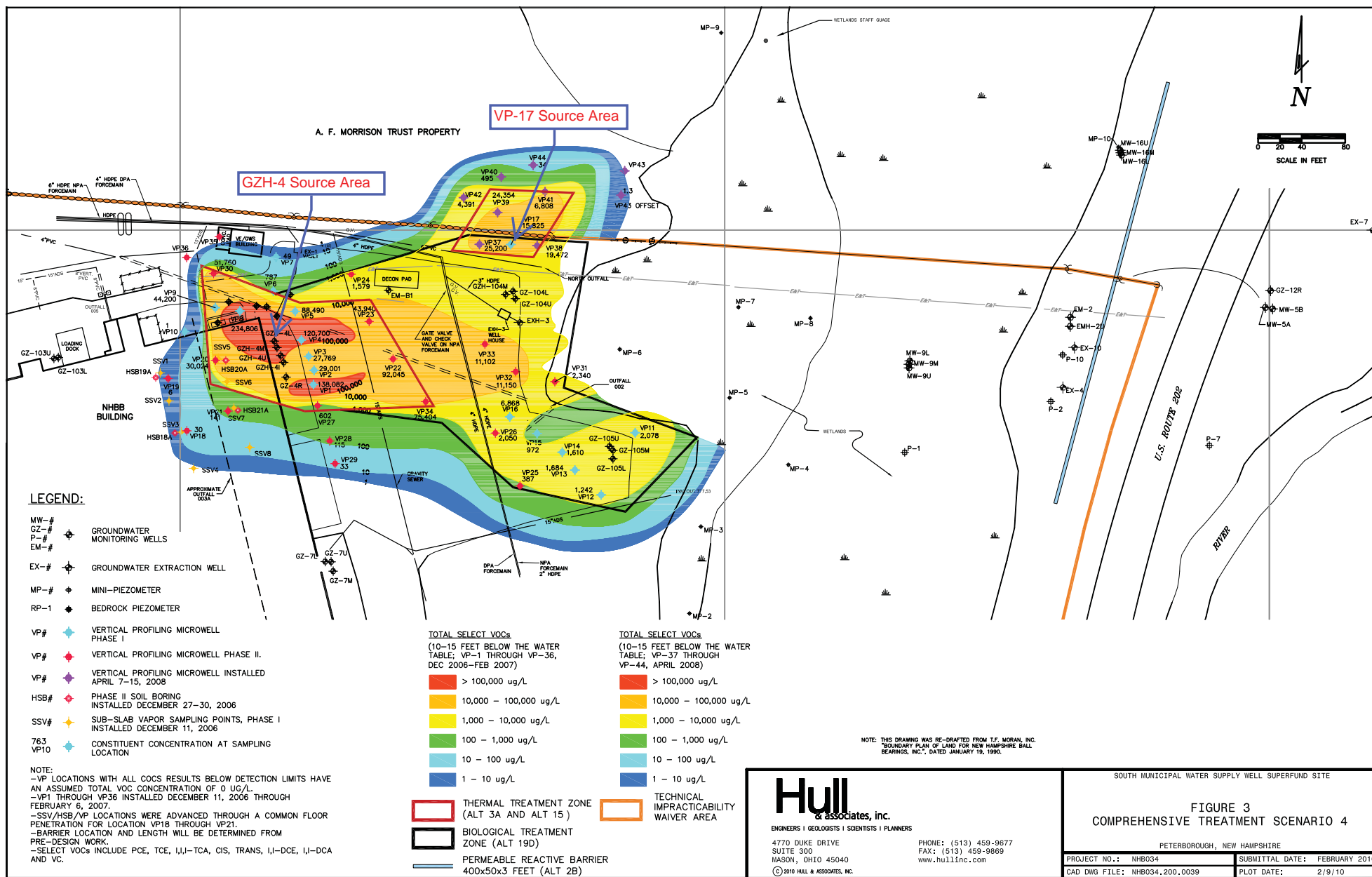
CAD DWG FILE: NHB034.200.0037

SUBMITTAL DATE: FEBRUARY 2010

PLOT DATE: 2/18/10

SOURCE: THIS DRAWING WAS RE-DRAFTED FROM T.F. MORAN, INC. "BOUNDARY PLAN OF LAND FOR NEW HAMPSHIRE BALL BEARINGS, INC.", DATED JANUARY 19, 1990.





APPENDIX B

STATE OF NEW HAMPSHIRE LETTER OF CONCURRENCE



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner



September 24, 2010

James T. Owens, III, Director
Office of Site Remediation and Restoration
US EPA New England, Region I
5 Post Office Square, Suite 100
Boston, MA 02109-3912

**SUBJECT: Peterborough – South Municipal Water Supply Well Superfund Site
DES Site # 198404060, Project RSN # 73**

**Amended Record of Decision
Declaration of Concurrence CERCLIS ID# NHD980671069**

Dear Mr. Owens:

The New Hampshire Department of Environmental Services (Department) has reviewed the Amended Record of Decision (AROD), dated September 2010, for the South Municipal Water Supply Well Superfund Site (Site) in Peterborough, New Hampshire. The United States Environmental Protection Agency (EPA) prepared the AROD in accordance with the provisions of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986. The AROD addresses the remedial actions necessary under CERCLA, as amended, to manage potential threats to human health and the environment at the Site.

Rationale for the AROD

The 1989 Record of Decision (ROD) selected groundwater extraction and treatment as a component of the overall remedy at the Site. The remedy is not functioning as intended by the 1989 ROD and subsequent Explanation of Significant Differences (ESDs). EPA determined the remedy is not protective of human health or the environment in part because it could not capture all portions of the contaminated groundwater while the South Municipal Well was pumping. The amended remedy eliminates the extraction and treatment requirements for contaminated groundwater and focuses on the in-situ treatment of Site source areas on, and adjacent to, the New Hampshire Ball Bearings (NHBB) property.

In 1993, EPA issued an ESD that allows natural attenuation of the leading edge of contaminated groundwater and specifies excavation of contaminated sediments. In 1997, EPA issued a second ESD which established that it was technically impracticable to restore groundwater quality within a reasonable time frame due to the presence of Dense Nonaqueous Phase Liquid (DNAPL) in certain portions of the Site, and consequently specified that hydraulic containment, via on-site extraction

wells, would be established in the NHBB contaminant plume, allowing use of the South Well if necessary in the future.

In 2003, long-term pump-testing of the South Well was initiated to evaluate the potential for returning the South Well to use. The tests, which continued into 2005, indicated that the hydraulic containment system did not adequately contain contamination when the South Well was operated over a long period of time at elevated extraction rates. The containment wells have been experiencing specific capacity losses over the last several years due to persistent biofouling. Although NHBB has implemented a regularly scheduled maintenance program, only temporary increases in well efficiencies have been observed following the well cleaning and maintenance, and the wells have continued to generally diminish in capacity over time. The results of the pumping test and the progressive deterioration of the extraction wells used for containment provide early indications that the existing system cannot meet the remedy objectives to simultaneously contain the on-site contaminant plume and protect the South Well under full operating conditions.

Due to the inability of the existing hydraulic containment system to meet the remedy objectives, as demonstrated by the long-term pumping test results, additional investigations into the location and extent of contaminant source areas were performed so alternative remedies capable of reducing contaminant source areas could be studied. Additional investigations included a source area delineation performed from 2006 to 2007 and supplemental soil/groundwater sampling accompanied by vertical groundwater profiling in 2008.

Based on the results of these additional investigations and studies, Hull & Associates, Inc., consultant to NHBB, prepared a 2008 Focused Feasibility Study (FFS) that identified and evaluated new remedial alternatives for plume management, source mass reduction and dissolved phase polishing for the Site. After reviewing the remedial alternatives evaluated in the FFS, EPA published the Proposed Plan in May 2010 outlining the change in remedial action at the Site. Specifically, the amended remedial action will include the following major components:

- in-situ capture and treatment of contaminated groundwater via a permeable reactive barrier;
- in-situ thermal treatment of contaminated soil and groundwater in identified source areas; and
- in-situ bioremediation of contaminated soil and groundwater after the in-situ thermal treatment program.

This AROD supplements the 1989 ROD remedy for contaminated soil and groundwater by applying a combination of remedial technologies on, and adjacent to, the NHBB property. The remedy implementation will be performed in accordance with state and federal applicable or relevant and appropriate requirements. Groundwater quality in the vicinity of the Site will continue to be monitored to evaluate remedial action performance. Performance monitoring will include future pumping tests on the South Well. Existing institutional controls regulate the pumping or use of

groundwater within a groundwater protection overlay district that includes the Site. Finally, in a letter to EPA, dated September 20, 2010, the Town of Peterborough indicated its support for the change in the remedy.

Justification for the Selected Remedy

The selected remedy will be protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate, is cost effective, and uses permanent solutions to the maximum extent practicable. The selected remedy will provide a high degree of overall protection, will be effective in the long-term, and will be permanent by providing treatment to reduce the toxicity, volume, and mobility of the contaminant mass material to cleanup levels that would allow for the reactivation of the South Well and reuse of the aquifer as a drinking water source by the Town.

State Concurrence

In reviewing the AROD, the Department has determined that the remedy change is consistent with the Department's requirements for a remedial action plan and meets all of the criteria for remedial action plan approval. The selected remedy provides for the continued monitoring of groundwater quality and implementation of institutional controls to manage the potential health hazards associated with exposure to contaminated groundwater until the aquifer may once again be a source of safe drinking water. Ultimately, the proposed remedial action will provide protection of human health and the environment. Therefore, the Department, acting on behalf of the State of New Hampshire, concurs with the selected remedy, as described in the AROD.

The Department also acknowledges and appreciates EPA's consideration of the strong community and State support for the selected remedy. In striving to maximize the effectiveness of limited public and private resources, the Department seeks reasonable and practical solutions to the complex challenges associated with contaminated site cleanups. EPA's dedication and continued partnership with the Department will ensure the achievement of our mutual environmental goals at this Site. To this end, the Department stands ready to provide whatever assistance that EPA may require.

Sincerely,



Michael J. Wimsatt, P.G., Director
Waste Management Division

cc: Thomas S. Burack, Comm., NHDES
Frederick J. McGarry, P.E., DEE, NHDES
Carl W. Baxter, P.E., NHDES
Richard H. Pease, P.E., NHDES
Thomas C. Andrews, P.E., NHDES
Kevin Heine, USEPA
Pamela Brenner, Peterborough Town Administrator

APPENDIX C

ARAR TABLES

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements	Safe Drinking Water Act (42 U.S.C. §300f <i>et seq.</i>); National primary drinking water regulations (40 C.F.R. 141, Subpart B and G)	Relevant and Appropriate	Establishes maximum contaminant levels (MCLs) for common organic and inorganic contaminants applicable to public drinking water supplies. Used as relevant and appropriate cleanup standards for aquifers and surface water bodies that are potential drinking water sources.	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area.
	Safe Drinking Water Act (42 U.S.C. §300f <i>et seq.</i>); National primary drinking water regulations (40 C.F.R. 141, Subpart F)	Relevant and Appropriate for non-zero MCLGs only; MCLGs set as zero are To Be Considered	Establishes maximum contaminant level goals (MCLGs) for public water supplies. MCLGs are health goals for drinking water sources. These unenforceable health goals are available for a number of organic and inorganic compounds.	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area. Non-zero MCLGs are relevant and appropriate. MCLGs set at zero are to be considered.
Federal Criteria, Advisories, and Guidance	EPA Risk Reference Dose (RfDs)	To Be Considered	RfDs are considered to be the levels unlikely to cause significant adverse health effects associated with a threshold mechanism of action in human exposure for a lifetime.	Hazards due to noncarcinogens with EPA RfDs are used to evaluate exposures to contaminated media. The remedy prevents exposure to contaminants through institutional controls and monitoring. Groundwater use restrictions will be maintained until risks identified under these standards are eliminated.

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Criteria, Advisories, and Guidance	EPA Carcinogenicity Slope Factor	To Be Considered	Slope factors are developed by EPA from Health Effects Assessments and present the most up-to-date information on cancer risk potency. Slope factors are developed by EPA from Health Effects Assessments by the Carcinogenic Assessment Group.	Risks due to carcinogens as assessed with slope factors are used to evaluate exposures to contaminated media. The remedy prevents exposure to contaminants through institutional controls and monitoring. Use restrictions will be maintained until risks identified under these standards are eliminated.
	Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	Guidance for assessing cancer risk.	Risks due to carcinogens are assessed using these guidelines. The remedy prevents exposure to contaminants through institutional controls and monitoring. Use restrictions will be maintained until risks identified under these standards are eliminated.
	Supplemental Guidance for Assessing Susceptibility from Early- Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	Guidance of assessing cancer risks to children.	Risks to children due to carcinogens are assessed using these guidelines. The remedy prevents exposure to contaminants through institutional controls and monitoring. Use restrictions will be maintained until risks identified under these standards are eliminated.

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Criteria, Advisories, and Guidance	Health Advisories (EPA Office of Drinking Water)	To Be Considered	Health Advisories are estimates of risk due to consumption of contaminated drinking water; they consider non-carcinogenic effects only. To be considered for contaminants in groundwater that may be used for drinking water where the standard is more conservative than either federal or state statutory or regulatory standards. The Health Advisory standard for manganese is 0.3 mg/l.	Health advisories will be used to evaluate the non-carcinogenic risk resulting from exposure to certain compounds. The remedy prevents exposure to contaminants through institutional controls and monitoring. Use restrictions will be maintained until risks identified under these standards are eliminated.
State Requirements	Drinking Water Quality Standards: NH Admin. Code Env-Dw 704 MCLs and MCLGs for Inorganics; NH Admin. Code Env-Dw 705 MCLs and MCLGs for Regulated Organics	Relevant and Appropriate for MCLs and non-zero MCLGs only; MCLGs set as zero are To Be Considered	State MCLs and MCLGs establish maximum contaminant levels permitted in public water supplies and are the basis of State Ambient Groundwater Quality Standards (AGQS) that are applicable to site groundwater. The regulations are generally equivalent to the Federal Safe Drinking Water Act (SDWA).	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area.

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	New Hampshire Ambient Groundwater Quality Standards (NH AGQS) (Env-Or 603.03, Table 600-1)	Applicable	Establishes maximum concentration levels for regulated contaminants in groundwater which result from human operations or activities. NH AGQS are equivalent to MCLs for contaminants that have MCLs. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established.	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area.
	Groundwater Protection Standards: NH Admin. Code Env-Or 603.01(a) and (b)	Applicable	Wm-Or 603.01(a) and (b) provide that groundwater shall be suitable for use as drinking water without treatment and shall not contain any regulated contaminant in concentrations greater than ambient groundwater quality standards established in Env-Or 603.03.	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area.

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Nondegradation of Groundwater to Protect Surface Water: NH Admin. Code Env-Or 603.01(c)	Applicable	Wm-Or 603.01(c) provides that, unless naturally occurring, groundwater shall not contain any contaminants at concentrations such that groundwater to surface water results in a violation of surface water standards in any surface water body within or adjacent to the site. Env-Or 603.01 (c) therefore incorporates surface water standards set forth at Env-Ws 1700.	Used to establish cleanup standards for groundwater. Long-term monitoring of contaminants, based on these standards, will be performed to evaluate whether the remedy is effective in preventing the migration of contaminants and achieving drinking water standards outside the TI Waiver Area.
	Soil Remediation Criteria, Env-Or 606.19	Applicable	Numeric soil remediation standards for organic and inorganic contaminants are established, with a provision for development of risk-based site-specific soil remediation standards.	Used to establish cleanup standards for soil. Risks posed by contaminated soils will be addressed through the reduction of the contaminant mass in the source areas (NHBB property and the VP-17 Area).

Appendix C
Chemical Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Criteria, Advisories, and Guidance	New Hampshire Department of Environmental Services Risk Characterization and Management Policy Appendix E Method 1 Soil Standards Selection	Relevant and Appropriate	Establishes soil standards for VOC contaminants found at the Site.	Used to establish cleanup standards for soil. The remedy will address the contaminant mass through in-situ thermal treatment and bioremediation of the source areas.
	New Hampshire Department of Environmental Services Risk Characterization and Management Policy (Section 7.4(5))	To be Considered	Establishes GW-1 and GW-2 guidelines for contaminants in groundwater. GW-1 values are equal to the NH AGQS values for ambient groundwater. GW-2 values are based on a subsurface vapor intrusion into buildings to calculate indoor air conservative risk assessments, and therefore apply to volatile contaminants only.	Risks due to groundwater contaminants are assessed using these guidelines. The remedy prevents exposure to contaminants by addressing the contaminant mass and through institutional controls and monitoring. Use restrictions will be maintained until risks identified under these standards are eliminated outside the TI Waiver Area.

Appendix C
Location Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements	Fish and Wildlife Coordination Act (16 U.S.C.. §661 <i>et seq.</i>); Fish and Wildlife Protection (40 C.F.R. §6.302(g))	Applicable	Any modification of a body of water or wetland requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency to develop measures to prevent, mitigate, or compensate for losses of fish and wildlife.	Wetlands are present in some areas of the Site. Operation and maintenance of the remedy may have some limited impacts to fish and wildlife resource areas. Planning and decision-making will incorporate fish and wildlife protection considerations in consultation with the resource agencies.
	Floodplain Management (40 C.F.R. 6.302(b); Appendix A)	Applicable	This regulation codifies standards established under Executive Order 11988. Action to avoid, whenever possible, the long- and short-term impacts associated with the occupancy and modifications of floodplains development, wherever there is a practical alternative. Promotes the preservation and restoration of floodplains so that their natural and beneficial value can be realized.	Portions of the Site may be within the 100-year floodplain. Remedial actions that involve construction in the floodplain areas, other than the potential installation of additional monitoring wells, may occur. If such actions are found to be necessary, the remedial design will include all practicable means to minimize harm to and preserve beneficial values of the floodplains. Floodplains disturbed by remedial actions will be restored to their original conditions and utility.

Appendix C
Location Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements	Protection of Wetlands (40 C.F.R. § 6.302(a); Appendix A)	Applicable	This regulation codifies standards established under Executive Order 11990. Under this requirement, no activity that adversely affects a federal jurisdictional wetland shall be permitted if a practicable alternative with lesser effects is available. Action to avoid, whenever possible, the long- and short-term impacts on wetlands and to preserve and enhance wetlands.	Wetlands are present in some areas of the Site. Operation and maintenance of the remedy may have some limited impacts to Federal jurisdictional wetlands. Wetlands disturbed by well installation, monitoring, or other remedial activities will be mitigated in accordance with requirements.
	Clean Water Act, Section 404 (33 U.S.C.. § 1344); Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323)	Applicable	Under this requirement, no activity that adversely affects a federal jurisdictional wetland shall be permitted if a practicable alternative with lesser effects is available. Controls discharges of dredged or fill material to protect aquatic ecosystems.	Wetlands are present in some areas of the Site. Operation and maintenance of the remedy may have some limited impacts to Federal jurisdictional wetlands. Wetlands disturbed by well installation, monitoring, or other remedial activities will be mitigated in accordance with requirements.

Appendix C
Location Specific ARARs
South Municipal Water Supply Well Superfund Site
Record of Decision Amendment

Authority	Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Criteria and Conditions for Fill and Dredge In Wetlands: RSA Ch. 482-A and NH Admin. Code Env-Wt Parts 300-400, 600, and 700	Applicable	These standards regulate filling and other activities in or adjacent to wetlands, and establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce, and public recreation.	Wetlands are present in some areas of the Site. Operation and maintenance of the remedy may have some limited impacts to State jurisdictional wetlands. Wetlands disturbed by well installation, monitoring, or other remedial activities will be mitigated in accordance with requirements.
	Native Plant Protection Act; RSA 217A and Res 1100-1108	Applicable	Prohibits damaging plant species listed as endangered within the State.	Listed plant species will be identified and remedial activities will comply with these standards.
	Terrain alteration adjacent to surface waters; Env-Ws 415 and RSA 485-A:17	Relevant and Appropriate	The purpose of these rules is to protect surface water quality from degradation resulting from any activity which significantly alters terrain or occurs in or on the border of the surface waters of the state. The permanent methods for protecting water quality described include: vegetated filter strips, grassed swales, detention ponds, wet ponds, constructed wetlands, infiltration trenches, infiltration basins and water quality inlets.	Activities performed in association with the implementation of the remedy, including groundwater monitoring, will be compliant with these standards and will result in the least adverse impact to surface waters/wetlands. Engineering controls (e.g. siltation controls, erosion controls) will be implemented during remedial activities to minimize harm to surface waters/wetlands.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements	Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 <i>et seq.</i> , Standards for identification and listing of hazardous waste, 40 C.F.R. Part 261	Applicable	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Wm 400). These provisions have been adopted by the State.	Any wastes generated by remedial activity will be analyzed by appropriate test methods. If found to be hazardous wastes, then they will be managed in accordance with the substantive requirements of the State hazardous waste regulations. Wastes that may be generated include investigation derived waste from monitoring activities and contaminated media produced during the operation and maintenance of other components of the remedy.
	RCRA, Standards applicable to generators of hazardous wastes, 40 C.F.R. Part 262	Applicable	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Wm 500). These provisions have been adopted by the State.	If remedial activity generates hazardous wastes, then they will be managed in accordance with the substantive requirements of the State hazardous waste regulations.
	RCRA, Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities, 40 C.F.R. Part 264	Applicable	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Wm 700).	If any hazardous waste is generated from remedial activities it will be treated, stored, and disposed of under these standards.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
Federal Requirements	Clean Water Act (CWA), Section 402, 33 U.S.C. § 1342; 40 C.F.R.. 122-124, 131, 136 - Discharge of Pollutants	Applicable	These standards address water discharges which may be directed to surface water.	If a discharge from the remedial action is directed to surface water the discharge will be treated, if necessary, so that these standards will be achieved. Monitoring will be performed to determine whether operation and maintenance of the remedy could potentially affect nearby surface water bodies, in accordance with Env-Or-607 (see below).
	OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) EPA 530-D-02-004 (November 2002)	To Be Considered	This guidance assesses health risks associated with vapor intrusion and mitigation.	Assessment and mitigation of potential vapor intrusion risks will be addressed in accordance with this guidance.
	CWA, Ambient Water Quality Criteria (AWQC), 40 C.F.R. 122.44	Relevant and Appropriate	These regulations establish water quality standards for protection of human health and aquatic life.	Used to establish monitoring standards for surface waters and sediments.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Contaminated Site Management, NH Admin. Code Env-Or 600: Part 607, Groundwater Management Permits; Part 608, Activity and Use Restrictions; Part 610, Monitoring; Part 611, Contaminated Soils	Applicable	Env-Or Part 607 provides for establishment of Groundwater Management Zones (GMZ) to control use of groundwater that exceeds AGQS, requires monitoring of the groundwater quality within the GMZ, requires implementation of measures to restore the groundwater quality, and requires an evaluation of the effectiveness of the measures. Part 608 establishes standards for setting institutional controls to protect human health and components of the remedy. Part 610 establishes standards for monitoring groundwater, including requirements and criteria for constructing, developing, and decommissioning monitoring wells. Part 611 establishes standards for managing contaminated soils.	A GMZ will be established for OU 2 to protect against use of contaminated groundwater. Note that even if compliance with these standards is achieved, groundwater use restrictions may still be required for the remedy if there are more stringent federal compliance standards that still have not been achieved. Activity and use restrictions will be established to prevent human exposure to contaminated groundwater and protect components of the remedy. Groundwater monitoring will be required until State groundwater standards are achieved throughout the GMZ (monitoring will be continued if additional Federal groundwater standards still need to be achieved). Groundwater monitoring wells will be installed, operated, and decommissioned under these standards. Contaminated soils generated from installation of wells and any other remedial activity will be managed in compliance with these standards.
	Identification and Listing of Hazardous Wastes, N.H. Admin. Code Env-Hw 400, Toxicity Characteristic	Applicable	These standards list particular hazardous wastes and identify the maximum concentration of contaminants for which the waste would be a RCRA characteristic waste. The analytical test set out in Appendix II of 40 C.F.R.. Part 261 is referred to as the Toxicity Characteristic Leaching Procedure (TCLP). The federal requirements 40 C.F.R. Part 261 are incorporated by reference.	Any wastes generated by remedial activity will be analyzed to determine whether they are listed or characteristic hazardous waste under these standards. Materials that are listed waste or exceed TCLP hazardous waste thresholds will be disposed off-site in a RCRA Subtitle C facility. Non-hazardous materials will be disposed appropriately.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Requirements for Hazardous Waste Generators, N.H.. Admin. Code Env-Hw 500 [formerly He-P Ch. 1905.06]: including Part 507 Storage Requirements; Part 513 Emergency/Remedial Actions	Applicable	Requires determination as to whether waste materials are hazardous and, if so, requirements for managing such materials on site prior to shipment off site. The federal requirements 40 C.F.R. Part 262 are incorporated by reference.	If remedial activity generates hazardous wastes, then they will be managed in accordance with the substantive requirements of these regulations.
	Requirements for Owners and Operators of Hazardous Waste Facilities/Hazardous Waste Transfer Facilities, N.H. Admin. Code Env-Hw 700 [formerly He-P Ch. 1905.08]: including § 702.10 Groundwater Monitoring; § 702.11, Other Monitoring; Part 706, Emergency/Remedial Actions; Part 708, Facility Standards	Applicable	This regulation establishes requirements for owners or operators of hazardous waste sites. Part 708 incorporates by reference the federal requirements under 40 C.F.R. Part 264, including but not limited to Subpart G (closure/post closure), Subpart I (containers), Subpart J (tanks)	If any hazardous waste is generated from remedial activities it will be treated, stored, and disposed of under these standards.
	NHDES Vapor Intrusion Guidance (July, 2006)	To Be Considered	This regulation addresses vapor intrusion impacts.	Assessment and mitigation of vapor intrusion pathways may be addressed in accordance with this guidance.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Fugitive Dust, N.H. Admin. Code Env-A Part 1002	Applicable	Requires precautions to prevent, abate and control fugitive dust during specified activities, including excavation, maintenance, and construction.	Precautions to control fugitive dust emissions will be required during site remediation activities that could generate dust, such as maintenance of the landfill cap and monitoring well installation.
	Regulated Toxic Air Pollutants, NH Admin. Code Env-A Part 1400	Applicable	This regulation identifies toxic air pollutants to be regulated. These pollutants are also listed by EPA in 40 CFR 261. High, moderate and low Toxicity Classifications are established. Air toxics in these classifications are regulated when they occur in concentrations that cause adverse health effects including increased cancer risk.	If there are remedial processes that result in releases of contaminants into the air, air quality standards will be complied with during remedial activities.
	Surface Water Quality Regulations, NH Admin. Code Env-Wq 1700	Applicable	These rules establish water quality standards for the state's surface waters. Water quality criteria for toxic substances are established. [See Part Env-Ws 1703 Water Quality Standards and Env-Ws 1704 Alternative Site Specific Criteria]. These rules are applicable to point or non-point discharge(s) of pollutants to surface waters.	Standards will be used for monitoring to measure the performance and effectiveness of the remedial action in preventing contaminated groundwater from degrading nearby surface waters.

Appendix C
Action Specific ARARs
South Municipal Water Supply Well Superfund Site,
Record of Decision Amendment

Authority	Requirement	Status	Requirement Synopsis	Action to be Taken to Attain ARAR
State Requirements	Interim Criteria for Groundwater Discharges: NH Admin. Code Env-Ws 402	Applicable	These regulations establish substantive requirements for discharges to groundwater, including prohibited discharges, compliance criteria, and water quality sampling.	If the operation and maintenance of the remedy requires discharge to groundwater, these standards will be complied with.
	Management of Contaminated Soil, NH Admin. Code Env-Or 611	Applicable	Establishes requirements for managing contaminated soils, including requirements for sampling and analysis of soil destined for off-site treatment or disposal, storage requirements for stockpiled soil, and disposal requirements.	Any remedial activities on the site that generates and stockpiles contaminated soil requiring on-site management or off-site disposal will comply with these requirements. Minimal soil generation is anticipated from the installation of monitoring wells.
	Standards for Construction, Maintenance and Abandonment of Wells, NH Admin. Code Env-We 600	Applicable	This provision requires that wells be constructed, maintained, relocated, and/or abandoned according to these regulations.	Wells used for the remedy will be created, operated, and closed in compliance with these standards.